STEEL
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THIS WEEK IN METALWORKING

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***Next Week*... Powder Cutting Handles Stainless with Ease... Welding Inconel "W" Sheet... Aluminum Containers Stretch Tin Supply... Titanium and Zirconium Emergency Substitutes for Manganese**

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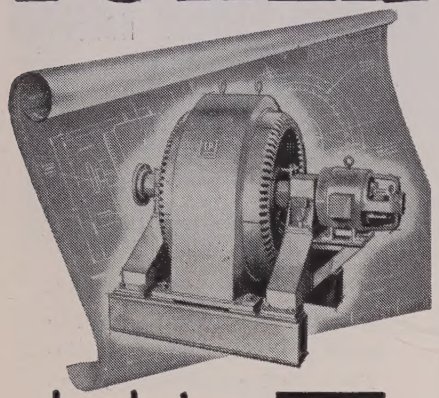

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X-74

Behind the Scenes...

IBM Honors Leonardo

International Business Machines Corp. had a unique exhibit at Madison and 57th street in New York, giving an idea of some of the accomplishments of that unique man, Leonardo da Vinci.

We went over a while back to see the collection of models constructed from da Vinci's scientific drawings. Representing science, engineering and invention, those scale models, made under the supervision of Dr. Roberto Guatelli, noted da Vinci scholar, gain special interest as the celebration of Leonardo's 500th birthday anniversary will be held throughout the world in 1952.

Famous the world over for his paintings of the "Mona Lisa" and "Last Supper," only recently has Leonardo become equally noted for achievements in anatomy, aerology and flight, mechanics, mathematics and optics. Five centuries ago Leonardo conceived such inventions as the helicopter, machine gun, airplane and even the airconditioner. Besides models on those items, enlargements were shown at the IBM exhibit of his original drawings in fields such as geology, botany and anatomy.

The models were originally built under the supervision of Dr. Guatelli for the 1938 exhibition of the genius' work in Milan, Italy. While on tour in Tokyo during World War II, the exhibition was completely destroyed. Dr. Guatelli began all over again after the war. Early in 1951 IBM acquired the new exhibit. It has been shown at the company's plants in Endicott and Poughkeepsie, N. Y. and will be divided into two groups and circulated among many of the IBM field offices across the country.

If you ever get a chance to see the exhibit, do so. From it, you'll gain the clear impression that the twentieth century man isn't so smart, after all.

Cover Story

The handsome cover appearing on this issue includes a fine photograph taken of a Ford Motor Co. use for radioisotopes. The story to which the cover refers deals with the fact that isotopes are now ready for use by medium and small companies. With all due respect to Ford, we would have preferred a photograph of isotopic activities taken by a smaller company, but a canvass of industry revealed that Ford is one of the few firms in the country taking photographs right at the time actual industrial isotopic operations are occurring. Hence, we relied on Ford, as we have several times before.

The gentleman responsible for the artwork on the cover is Pat Dwyer Jr.

Vulcan, Again

We've just received another note regarding our ignorance concerning Vulcan as the god of metalworking, a void in our education that we confessed Oct. 8. R. G. Sartorius, a metallurgist at National Lock Washer Co. tells us of an excellent etching drawn by Rockwell Kent in 1940 depicting Vulcan and his handmaids. Mr. Sartorius' reproduction of the etching carries the inscription: "Vulcan, God of Fire and Metal Work—Vulcan (Hephaestus), son of Zeus and Hera, was the artist-artisan of Olympus and the patron of craftsmen among men. So great was his skill that he fashioned golden handmaids and animated them to serve him at his forge."

Worry Wart

If you haven't anything to worry about at the moment, here's something that can really turn you gray. Today about 2.3 billion people live on this planet. In the last century, the world's population has more than doubled. In recent decades, in spite of two world wars, the rate of growth has risen to 1 per cent per year. That rate doubles a population in 69 years. If the rate of increase of only 0.5 per cent were maintained for another 2000 years, that would leave less than four square yards of the earth's land surface for each person. Move over.

Puzzle Corner

Our Oct. 15 printer needed 756 pieces of type. First in with that correct answer was our demon puzzle-solver, Robert W. Huff of Canton, O.

Four soldiers are in town for a beer. Their camp is five miles due south on a straight highway and three miles due east on a straight, direct, dirt road. They can make 5 miles per hour on the highway and 4 miles per hour across fields or on the dirt road. What route will get the boys to camp in the least time, and what is the time? The solution assumes, of course, that beer consumption was not enough to prevent pursuance of a straight course.

Shrdlu

(Metalworking Outlook—Page 27)

The Metalworking Outlook

October 29, 1951

Around Left End

Phil Murray's United Steelworkers are going to run interference for other major unions in the game to win higher wage levels for all of industry. First signals will be called after the Nov. 14-16 huddle of the steel union at Atlantic City to decide on wage strategy. The CIO group will seek to bowl over the opposition—pretty weak on the left-end government side—and through that expected hole other unions will go. That situation accounts for the unusual silence of normally vocal labor leaders such as John L. Lewis and Walter Reuther. They can afford to be quiet while Mr. Murray tries to do some of the work for them.

Mediocre Bargaining Positions

Mr. Reuther has yet another reason for relative silence on wage matters. Unemployment in Detroit is now more than 87,000, a gain in excess of 24,000 since last June. Conversion accounts for the layoffs in auto and auto supplier plants and has put a crimp in UAW wage plans since any wage negotiations start with the odds against the union when there's substantial unemployment. This year Mr. Reuther will be glad to make gains on Mr. Murray's power play. Nor is the Lewis bargaining position too strong. A lot of coal has been mined; stocks are high; pressure for a strike settlement would not be as great as usual.

Ominous Undercurrent

National income reached a seasonally adjusted annual rate of $27.5 billion in the second quarter of this year, the main reason why individuals saved $3.2 billion in liquid form during the same period, the highest since the third quarter of 1946. On the surface those figures look good, but there's this ominous undercurrent: Corporate profits before taxes were at the annual rate of $45.5 billion, a decline of more than $6 billion from the preceding quarter. That decline continues.

Profits: The Grind Will Be Finer

Corporate profits will be ground finer and finer from now on: By higher taxes on one side, by rising costs on the other. Costs this quarter are showing alarming increases for six major reasons: More delays in obtaining purchased parts, higher costs of many alternate materials and processes, increased costs of expediting, withdrawal of extreme quantity discounts and production interruptions caused by shortages.

The Gap Narrows

The Munitions Board is working on a survey, to be ready soon, that will give a comprehensive picture of future machine tool needs. The indexes compiled by National Machine Tool Builders' Association re-

Production-Engineering News—p. 63 The Market Outlook—p. 103

veal that demand is still far ahead of supply, although the gap is narrowing. The preliminary shipment index for September, based on average deliveries from 1945 through 1947 was 189.8, the highest this year. The new order index hit 380.2 of the same base period. That's well above shipments but still the lowest new-order figure this year.

Tool, Die Shops Loaded

Backlog of tool, die, jig and fixture orders for contract tool and die shops has reached the highest level since 1945. It's triple the backlog at the outbreak of the Korean war. Industry output for 1951 is expected to be well above the 1950 total of $325 million.

Too Complicated?

Watch for developments in mass-production techniques for turning out complicated electronic items. Output of that class of product for defense has been below requirements, because thus far the assembly line methods used effectively to build home radio and television sets haven't worked well for more elaborate equipment. Defense Production Administration is seeking solutions.

The Search for Sponge Iron

The government may give financial and priority assistance in the search for a successful sponge iron process. Julius Madaras has a process along the lines of that developed by the Bureau of Mines at Minneapolis and wants a U.S. loan to build a plant at Longview, Tex. A House Armed Services subcommittee is expected to recommend that Mr. Madaras be loaned enough money—perhaps $3 million—to erect a plant with a capacity to produce 100 tons of sponge iron a day.

Straws in the Wind

Department of Agriculture has tightened its rules for allocating steel, copper and aluminum supplies to farmers and food processors . . . Simplot Iron Mines Inc. is reported to be shipping 1500 tons of low-grade iron ore daily from its Nevada mines to Japan . . . Sulphur stockpiles are at a minimum for national security and must not be further reduced, warns Langbourne M. Williams Jr., president of Freeport Sulphur Co. . . . More than 6000 Republic Steel Corp. supervisors are enrolled in the company's economic education program as it starts its second year.

What Industry Is Doing

You don't have to be big to use the little atom (p. 35) . . . Demand for structural steel is 205 per cent of supply next quarter, so to get your new plant built, you'll have to convince Washington of its essentiality (p. 37) . . . OPS will develop tailored price curbs to do away with general ceilings now in effect (p. 39) . . . The super-priority DX symbol works fine when you get it, but the job is to get it (p. 39) . . . A record European steel output is likely in 1951 (p. 45) . . . You can sell it to the Seabees (p. 46) . . . The lag in casting deliveries puts a welcome load on makers of welded assemblies (p. 47).

Camel Under the Tent

Strong emphasis is being placed upon the danger of further entrenchment of bureaucracy in our federal government under the excuse of emergency. C. E. Wilson, president of General Motors Corp., stated the case clearly when he told a Dallas audience that "the camel of government control now has his nose under the tent of free competitive enterprise and is crowding in. We will all have to watch him or he will take over the tent and we will lose our economic freedom.

"The present emergency," he continued, "is being used to promote regimentation under the false assumption that this is the best way to get the job done. . . . If in the process of organizing our strength in the hope of avoiding war, we lose the basic freedoms that Americans have enjoyed for 175 years, we would lose the very values for which we would be willing to fight such a war."

In similar vein, Economist Ralph Robey last week told members of the American Institute of Steel Construction that fear of a long controlled economy is no myth. "The current emergency may last 10, 20 or 30 years," he predicted, and "emergency powers granted now may not be lifted during the lifetime of adults now living."

This has terrific implications. Nobody can dismiss it as the statement of an alarmist because every day somebody high in Washington officialdom warns us that we are in for a long period of crisis—10, 12 or 15 years. If we must endure controls over this period under conditions far short of all-out war, then our free competitive system is doomed.

Defense Mobilizer Wilson, Commerce Secretary Sawyer and a few others in government have stated they favor easing and elimination of controls at the earliest possible moment. Opposed to this view is the growing army of federal job holders, substantial numbers of whom believe in a planned economy and will exert every possible effort to make controls permanent.

Industrial leaders should use every legitimate influence to guard against the increase of unnecessary controls and to demand the abandonment of controls whenever possible. Some controls could be discarded now.

E. C. Shaner

EDITOR-IN-CHIEF

ISOTOPES IN INDUSTRY: Since Aug. 2, 1946, when Atomic Energy Commission's isotope program became effective, more than 19,000 shipments of radioactive isotopes have been made from Oak Ridge, Tenn., for use in peacetime research. At last midyear radioisotopes supplied by the commission were in use in 1185 departments of more than 500 organizations in

the United States and in 175 institutions in 29 other nations. About one-fifth of the users are industrial corporations.

Most common isotopic applications are in radiography and as tracers. In radiography, cobalt 60 is the isotope usually employed, along with standard x-ray technology. The metallurgist of a foundry that has been using isotopes for about a year says that "radiography, using cobalt 60 as a gamma-ray source, has become a very useful foundry tool for us. This low cost and easy-to-use method not only has helped us avoid shipment of castings with internal defects but also is teaching us more about the principles of gating and risering castings."

If you have been shying away from isotopes because you thought their use is costly and complicated, take another look. —p. 35

* * *

BEST YEAR SINCE '29: More than 600 members and guests attending the 29th annual convention of the American Institute of Steel Construction at White Sulphur Springs last week were torn between two emotions. On the one hand they were elated that their fabricated structural steel industry in 1951 is enjoying its best year since 1929. Its bookings will total 3.2 million tons, shipments will be near 3 million tons and unfilled order backlog is around 2.7 million tons. Big question is whether enough steel will be available to complete jobs booked.

On the other hand, the structural steel people are not happy about the switch from normal trade to doing business under NPA controls. All sorts of injustices and cases of maldistribution are inevitable under controls, however worthy may be the intent of the controllers. A hint as to the severity of the squeeze is found in the cold fact that demand for first quarter 1952 is more than double the supply. —p. 37

* * *

REVISES PRIORITIES: Metalworking companies engaged in or contemplating defense work may be affected by the refinement in policy just announced by Defense Production Administration in regard to certificates of necessity permitting fast tax amortization. Moratorium on issuance of certificates has been lifted and henceforth they will be based upon a revised scale of essentiality.

Priority now goes in the following order to facilities for producing machine tools, dies, gages, jigs and fixtures; ores such as copper, lead and zinc; pig iron; sulphur; and tanks, planes, guns and other weapons. Below these five categories are facilities concerned with basic aluminum, nitrogen, aviation gasoline, steel scrap and special aluminum extrusions. Order of priority will be changed from time to time as new conditions warrant. —p. 37

* * *

CHANGE SCRAP PRICES: Office of Price Stabilization has amended its ceiling price regulation No. 5 on steel scrap. No. 1 bundles replace No. 1 heavy melting steel as the base for calculating ceiling prices. Identical prices $1 below quotations for No. 1 bundles now become the ceilings for No. 1 heavy melting, No. 2 heavy melting and No. 2 bundles.

Intent of the new regulations is to stimulate collections and utilization of urgently needed steelmaking scrap. Pricing the two heavy melting grades at the same level is expected to relieve handlers of the expense of segregating material into two classifications. Placing No. 2 bundles in the price bracket with heavy melting grades should permit dealers to combine all three grades to fill a car and expedite shipment.

Trade opinion differs as to effectiveness of the new schedules but agrees that the move is in the right direction. —pp. 39, 122

* * *

TRADING WASTE ACIDS: Handling industrial wastes is one of the major nuisances for companies operating plating rooms. Sometimes a little investigation of the needs of other manufacturers in the vicinity of the plating room will lead to an easy solution of the waste problem.

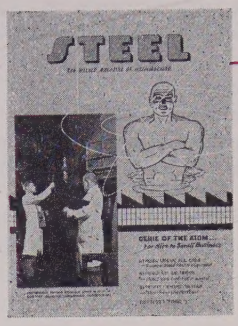
One company, which had been struggling with an acid-pickling-waste headache, found instant relief when it discovered that a neighboring firm would be delighted to buy its dilute sulphuric acid for use in the manufacture of fertilizer. In another case, waste from a dye manufacturer's plant consisted of sulphuric acid strong enough for pickling. Pickling with sulphuric acid produces ferrous sulphate as a waste. Presto! The dye manufacturer traded his waste to the pickling plant in exchange for the ferrous sulphate which he needed in his process.

This idea of swapping spent acid solutions may have attractive possibilities in some industrial areas. —p. 66

The Atom: For Small Business, Too

Industrial applications for radioisotopes have developed so rapidly that widespread use of the atomic energy by-product is now practical for small and medium-sized companies

By JOHN S. MORGAN, Associate Editor



The genie of the atom may be able to work wonders for you, whether your company is big, medium or little. Thus far an atomic energy by-product, the radioisotope, has the most immediate practical applications.

YON DON'T have to be big to use the little atom.

Despite that fact, the reaction among many firms when talk comes up about industrial applications for atomic energy is: "The atom in industry? Yes, for companies in the heavyweight class, but we in the middle and lightweight divisions can't handle it yet." They fear that the difficulties of handling any atomic energy by-products are beyond their scope and that the uses are thus far confined solely to ivory tower research. Is that reaction well-founded?

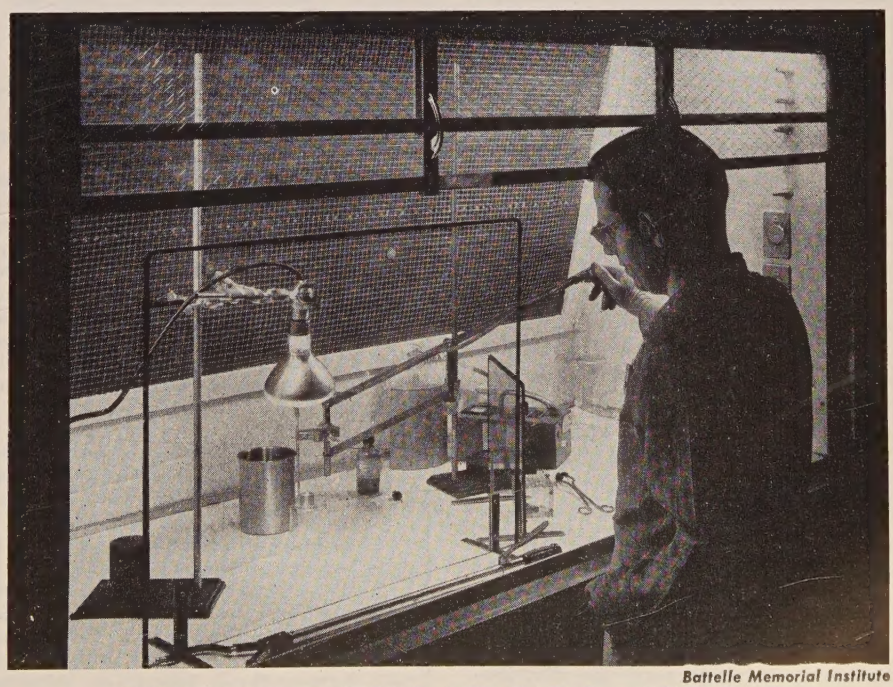
No, Again No—"No," says John Bradford of Case Institute of Technology's Radioisotopes Laboratory, Cleveland. "No," says Norman Jacobson, technological information officer for the Atomic Energy Commission, Washington. "No," say the actual users of atomic energy by-products in at least three metalworking companies—The Cincinnati Milling Machine Co., Cincinnati; Brush Development Co., Cleveland; and Grede Foundries Inc., Milwaukee.

It's true that some industrial atomic energy applications are in the ivory tower stage. A small or medium-sized company would not find it commercially feasible to work on atomic power as a means of propelling ships, but Westinghouse Electric Corp. is big enough to do so even though practical applications are probably years away. It's true that some industrial atomic energy applications necessitate facilities now beyond the scope of the average firm, although General Electric Co. is big enough to explore the possibilities of using the atom to generate power.

The Jackpot — But there is one atomic energy by-product, the radioisotope, that can be widely used in industry, if the individual company is willing to invest a modest sum in training personnel to handle isotopes and between $2000 and $12,000 on facilities to cope with the radioactive materials.

More and more manufacturing firms are discovering the advantages of isotopes, particularly of cobalt 60, the most commonly used in industry. Hans Ernst, director of research for Cincinnati Milling, reports his company has been studying and using isotopes in metalcutting research for three years. He terms the isotope a "very effective, efficient and practical research tool." Dr. Hans Jaffe and Dr. Danforth Hale of Brush Development have been using cobalt 60 for 18 months as a means of determining the growth of quartz crystals inside a cylindrical steel autoclave with walls 1¼ inches thick. "We found the procurement of isotopes surprisingly simple," they say, "and the Atomic Energy Commission was cooperative in advising us on the general handling facilities we should get." V. F. Mikelonis, Grede Foundries metallurgist, says his company has been using isotopes almost a year. "Radiography, using cobalt 60 as a gamma-ray source, has become a very useful foundry tool for us," he testifies. "This low cost and easy-to-use method of radiography has not only helped us avoid the shipment of castings with internal defects but is daily teaching us more about the principles of gating and risering castings."

The Greeks Had a Word for It—The word, isotope, from the Greek isotopos or "sameplace," derives from the fact that isotopes occupy the same place in the periodic table and are variant forms of the same chemical element. The existence of naturally occurring radioactive isotopes has been known ever since the beginning of the twentieth century. The Curie experiments in the 1930s pointed the way to produce artificial radioactive isotopes. Until Aug. 2, 1946, both natural and artificial ra-



Battelle Memorial Institute

ENOUGH RADIOISOTOPES—NOT ENOUGH TECHNICIANS

. . . required are skill and training to use this remote-handling equipment

dioactive isotopes were too scarce and too expensive ever to be used for commercial purposes, except in unusual cases.

Inexpensive radioisotopes were made possible by the atomic energy program and the development of the nuclear reactor. Five years ago, on Aug. 2, the first shipment of radioactive elements for use in peacetime research was made from the reactor at Oak Ridge, Tenn. The price was much lower than for isotopes developed in cyclotrons, the older method —still in use—for producing them. The Oak Ridge cost has dropped even since 1946 and now averages about $50 per isotope shipment, including freight and packaging charges.

Growing—In July, 1947, when the Atomic Energy Commission's isotope program was a year old, 241 departments in 160 organizations of all types used isotopes; two years later there were 549 departments in 305 organizations. By the end of June, 1951, radioisotopes supplied by the commission were in use in 1185 departments of more than 500 organizations in the U. S. and in 175 institutions in 29 nations abroad. About 20 per cent of all organizations now using isotopes are industrial—and the ratio is rising.

In the year ending June 30, 1951, more than 7500 shipments of radioactive isotopes were made from Oak Ridge, some 1000 of which went to industry. In that one year were made more than 40 per cent of the 19,000 shipments delivered since 1946. Added to the 7500 shipments already mentioned are more than 2000 made from other supply sources and known as secondary shipments. The secondary phase of production may become increasingly important because two commercial firms—Bendix Aviation Corp., Detroit, and Tracerlab Inc., Boston—are studying the feasibility of producing, processing and selling radioisotopes.

Handy—Radioisotopes are uniquely useful because they behave chemically like all other atoms of the same element and because they give off radiation by which they may be identified. The two most common isotopic applications are in radiography and as tracers. In radiography, cobalt 60 is the isotope usually employed, and standard x-ray technology is used. Some 72 industrial companies today are handling their radiography work with cobalt 60, the shipments of which in the past 12 months have increased by 564 per cent over the total shipped during the first four years of the distribution program. "Where standard x-ray techniques are used in industry," says Case Institute's Mr. Bradford, "cobalt 60 can probably be used."

The types of problems best solved by isotopic tracers are: Where extremely small quantities of materials are involved; where the material to be traced is associated with some other material; where a rapid determination must be made; and where effects of the material within itself are to be determined, as in diffusion.

The ABC's — So, you are with a small or medium-sized company and want to investigate the possibility of using isotopes. How to go about it?

First, get someone in your organization acquainted with isotopes. That individual preferably should have some policy-level job. Desirable, also, is the hiring of consultants. A list of some, but not all, who specialize in industrial applications is on this page. The consultant and your own man should explore all methods of solving your problems. It's possible that other techniques can work as well as isotopes.

While you are deciding if radioisotopes can do the job, write to Atomic Energy Commission, Isotopes Division, P. O. Box E, Oak Ridge, Tenn., for Isotopes Catalog and Price List No. 4, plus the reprints and procurement forms they hand out.

Once you have determined that you can use isotopes, outline the problem, method of approach and type of isotope you would use.

Then learn from your catalog, your consultant, or directly from AEC the laboratory conversion job you will have to undertake and the instrumentation necessary for safety of personnel. Assuming that you already have a normal laboratory setup, you can convert for a cost averaging about $3000 or $4000 if you are dealing with weak radiation in your isotopes and if the waste disposal and shielding problems aren't serious. In cases of strong radiation, prepare to spend $10,000 to $12,000. The actual cost of isotopes—$50 per shipment on the average—is a negligible factor because for some investigations one shipment can be enough for up to 300 tracer experiments.

Next, be sure to get company personnel trained in the use of isotopes. A shortage here has nipped more than one isotope program for a small or medium company. Oak Ridge Institute of Nuclear Studies offers a one-month course on handling of isotopes. About a dozen schools in the country also have courses, including Case, Rensselaer Polytechnical Institute, Massachusetts Institute of Technology and California Institute of Technology.

Then, if Oak Ridge approves your instrumentation, your laboratory conversion and the competence of your personnel, you're ready to order your radioactive material. Submit applications for isotopes to the Isotopes Division on form AEC-313; after review and approval, the division issues an authorization for procurement, form AEC-374. Then deal directly with the supplier, usually Union Carbide's Carbide & Carbon Chemicals Co. at Oak Ridge.

Men who know about the atom in industry agree that—in the form of radioisotopes—it can today give you knockout power to lick many technical problems, whether your company is in the heavy, middle or lightweight divisions.

Consultants for Industrial Isotope Applications

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J. Halpern, Physics Department, University of Pennsylvania, Philadelphia
A. F. Reid, Southwestern Medical School of the University of Texas, Dallas

Not Enough Structural Steel

Demand is 205 per cent of supply next quarter, steel construction meeting told. To get your new plant built, you'll have to convince Washington of its essentiality

PLANNING NEW construction within the next year? If so, be ready to convince Washington of its essentiality. Otherwise you probably will not be able to obtain structural steel.

Structural steel demand for the first quarter of 1952 is 205 per cent of the anticipated supply. The imbalance will peak in the second and third quarters. Some improvement in balance is expected by the fourth quarter, provided the military picture does not worsen.

Pick and Choose—Meanwhile, less essential construction demands will be deferred and available structurals channeled to military and defense expansion projects, including the expansion in machine tool, aluminum and steelmaking capacity. Public roads, schools, hospitals and non-essential industrial and commercial construction must wait.

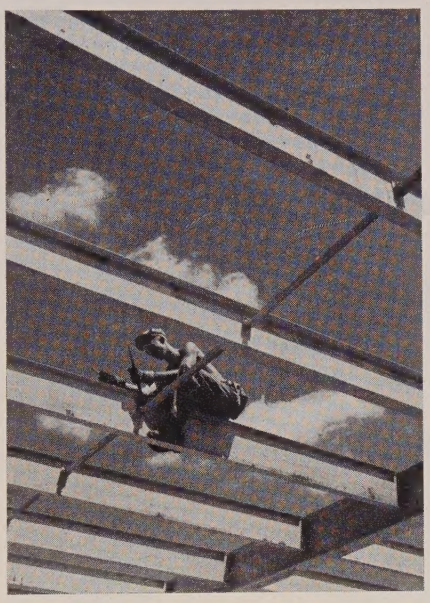
That is the picture presented by Defense Production Administration spokesmen to more than 600 members and guests at the 29th annual meeting of the American Institute of Steel Construction Inc. at the Greenbrier, White Sulphur Springs, W. Va.

Unhappy—The members of the structural steel fabricating industry which includes 900 companies employing 100,000 people and doing $1 billion worth of business annually are not happy about the switch from normal trade to NPA controls. Many stories of maldistribution of steel were heard in meeting rooms and corridors of the hotel. Speculation as to when controls will end was noted in conversations by delegates.

Despite concern over the future, the fabricated structural steel industry in 1951 is experiencing its best year since 1929. Bookings for the year will total 3.2 million tons. Shipments will approximate 3 million tons. Backlogs are 2.7 million tons. The big question now is: Can the fabricators obtain the steel to complete jobs booked?

Maybe they can. An optimistic and dissenting view was expressed by J. V. Honeycutt, assistant vice president, Bethlehem Steel Co. Average tonnage booked by the construction industry "has been going down since April, and the backlog of the order-book is decreasing," he said. Mr. Honeycutt believes that buyers' requests to the Defense Production Administration for structural steel shapes are greatly inflated and highly misleading.

No Myth—The fear of a long controlled economy is no myth, said Dr. Ralph Robey, vice president and chief economist, National Association of Manufacturers. Many people in the administration sincerely believe in a planned economy, said Dr. Robey, and now they are playing for keeps.



QUICK STIFFENERS: Doubling the stiffness of ordinary tie-rods, the lateral bracing of angles with clips welded to the ends and bolted to the web of the beams also reduces installation time at least 25 per cent. Reason: Less adjustment time is required

DPA Changes Aid Program

A more selective system of priorities will govern issuance of DPA certificates of necessity

EMPHASIS on plant expansion and improvement will take a new bent as the Defense Production Administration lifts the moratorium on fast tax amortizations. Issuance of certificates of necessity will be based on a revised scale of essentiality.

Top priority now goes to facilities involved in the production of machine tools, dies, gages, jigs and fixtures; ores such as copper, lead and zinc; pig iron; and sulphur in that order. Fifth on the list in degree of essentiality are facilities for making tanks, planes, guns and other weapons "urgently needed by the armed services."

Subject to Change — Also listed among the ten highest priority items for the initial stages of the new plan are facilities concerned with basic aluminum, nitrogen, aviation gasoline, steel scrap and special aluminum extrusions. Manly Fleischmann, DPA administrator, points out the order of priority and the priorities themselves are not permanently fixed but may be changed from time to time as conditions warrant.

Better control over new construction is expected by the elimination of applications for certificates after construction has already started. After Nov. 1, 1951, a certificate of necessity will not be issued unless the certificate or a letter of intent is obtained from the Defense Production Administrator prior to beginning construction. Until now application for a certificate could be made up to six months after construction had begun—leaving the DPA in the position of deciding whether there were labor and material available and a need for a building which was already partially, in some cases nearly all, completed.

Priority Within Priority — Within any particular priority group applications for building which has not yet started will be processed ahead of those for building which has already been started if the already started facilities will not be able to fulfill established goals. This preference will be given to encourage the program. In case the already started facilities will come close to eliminating the shortage, it will get the green light to avoid certifying in excess of requirements.

In effect a more flexible and selective system of allocating scarce steel, copper and aluminum replaces the hit-and-miss program followed in the first rush of mobilization. Instead of spreading the available metals thinly over all industry, with emphasis on getting end product to the armed services, the present tendency is to favor a buildup of raw materials sources and machine facilities to support a long-range effort.

Union Carbide Builds Pilot Plant

Union Carbide & Carbon Corp., New York, is building an $11 million pilot plant at Institute, W. Va., as a step toward commercial production of critical aromatic chemicals and gasoline by the hydrogenation of coal.

The plant will be devoted to research and development, but at the same time will commercially produce

pitch coke, naphthalene, solvent naphtha, coal tars, tar acids, special carbons, light oils, benzene and toluene. The facility is designed to process about 300 tons of coal per day.

Opening for Open-hearth Shop

First heat will be tapped tomorrow from Jones & Laughlin Steel Corp.'s new two-million-tons-a-year open-hearth shop at its Pittsburgh Works. Among those present at the event will be Defense Mobilizer Charles E. Wilson.

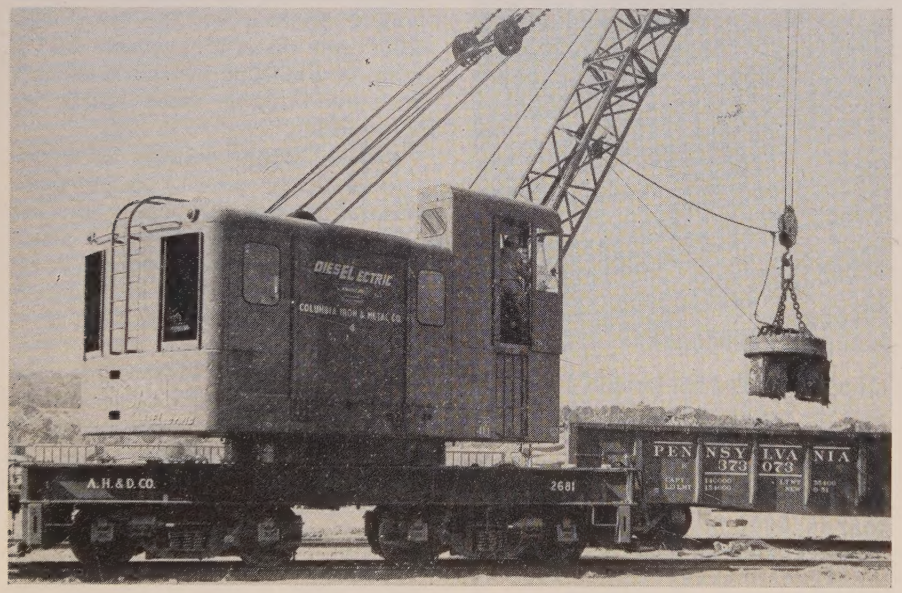
Texas To Get Alcoa Smelter

Additional primary aluminum—85,000 tons annually—will be forthcoming from Aluminum Co. of America. General Services Administration has contracted with Alcoa for construction of new facilities at Rockdale, Tex., to be in partial operation by late 1952. Alcoa facilities at Mobile, Ala., will also be enlarged to step up production of alumina 170,000 tons annually.

Private capital will be used to finance the expansion, but GSA promises assistance if needed. Contract provisions obligate Alcoa to sell in the open market up to two-thirds of the pig and ingot produced minus the amount required by the government for five years, and 25 per cent to users with no primary producing facilities of their own for 15 years thereafter. This provision is contained in agreements with other producers taking part in the aluminum expansion program.

Now being built under similar agreements with GSA are a new smelting plant at Wenatchee, Wash. (85,000 tons annual capacity), and addition of two lines at Alcoa's Point Comfort, Tex., works (35,000 tons annual capacity).

Lift for Scrap: New Yard Boosts Capacity



IMPETUS to the iron and steel scrap drive will be given with the opening tomorrow of a new scrap preparation yard at Girard, O.

Helping the new yard's owner, Columbia Iron & Metal Co., Cleveland, with the opening ceremonies will be Manly Fleischmann, administrator of the National Production Authority, who is scheduled to speak.

The new yard of 28 acres was built from scratch on the site of a former steel mill and adjoins the Brier Hill plant of the Youngstown Sheet & Tube Co. Eleven railroad tracks totaling six miles were built within the yard. It is possible to serve 300 freight cars at one time.

Equipment includes five diesel-electric cranes, a 200-ton track scale, a truck scale, a scrap baling press, four alligator shears, and a 1500-foot cutting line for propane gas and oxygen. Outlets from this underground pipeline can accommodate more than 100 torch operators. The yard is equipped with lights for night work. Modern locker and washing facilities also are provided.

Present equipment gives the yard a capacity of from 12,000 to 15,000 tons of scrap iron and steel a month. This will be built up to an eventual capacity of 25,000 to 30,000 tons a month.

The new yard is being established to serve the Youngstown area's iron and steel mills. Columbia Iron & Metal, scrap dealer and broker, also has a scrap preparation yard at Cleveland. Executive head of Columbia Iron & Metal is Alex Miller.

Blast Furnace Output Slips

Blast furnace output in September declined below that of August although the September operating rate was slightly higher. Cause of the drop in tonnage was a shorter month.

Only two other months this year—February and April—had lower blast furnace production than September's 5,890,102 net tons. High month of the year was May with 6,173,360 tons. In September, blast furnaces operated at 99 per cent of capacity. In August, they operated at 98.5 per cent of capacity but because that was a 31-day month they turned out 6,062,753 tons.

For the first nine months the operating rate averaged 98 per cent of capacity.

Although total output by blast furnaces in September was lower than in August, the production of ferromanganese and spiegel was higher. Additional details and comparisons from reports by the American Iron & Steel Institute follow (figures are in net tons):

	Pig Iron	Ferromanganese and Spiegel	Total Blast Furnace Output
1951			
August ...	6,004,641	58,112	6,062,753
September .	5,827,269	62,833	5,890,102
9 mos.	52,599,762	547,130	53,146,892
1950			
September .	5,638,325	58,798	5,697,123
9 mos.	47,989,083	490,787	48,479,870

Steelworkers Meet

Executive committee of the United Steelworkers of America held a two-day meeting in Pittsburgh last week at which grievances were reviewed.

Philip Murray, president of the union, emphasized that the two-day meeting was not concerned with wage policy matters. These, he said, will be drafted at the union's scheduled meetings in Atlantic City, N. J., Nov. 14-16.

Pyramiding by Subcontract

Sixty cents of every dollar received by General Electric Co. from the Air Force for jet engines during the past year went to other companies.

Supplying components and material for the GE J-47 engines are 4070 firms, of which more than 75 per cent are small business. Of the 907 companies which filled in a questionnaire sent out by GE to 2600 suppliers, a total of 429 said that they in turn did business with a total of 49,488 organizations classified as small business and 16,039 large firms.

OPS Begins Repairs

It will develop tailored price curbs to do away with general ceilings now in effect

OPS is starting a big repair job in its pricing regulations that it insists "does not represent a major policy change," but that nevertheless may make much of the present control architecture unrecognizable.

The Office of Price Stabilization has ordered its commodity division directors "to proceed at once" with the development of tailored regulations for manufacturers and processors.

Goal—The object of the move is to: Supplant present interim regulations with tailored regulations adopted specifically for each industry or industry segment, based on its own problems and practices; apply "identifiable" dollars and cents ceiling prices in every case possible, to make clear to the seller and buyer the legal prices; reduce ceiling prices, although lower ceilings will be imposed only if "generally fair and equitable"; increase ceilings in instances where, because of cost increases, existing ceilings are no longer generally fair and equitable.

Dollars-and-cents ceilings will be usually restricted to standardized goods. Other control techniques that will be used include: The straight freeze, where a suitable base period with a satisfactory price level can be found; a modified freeze, where a base period can be found providing prices which can be adjusted to reflect more recent costs; and a formula technique, setting ceilings on the basis of some mark-up over certain elements of cost, especially where a seller has used a historical mark-up.

Guide Posts—In a set of standards, OPS lays out a blueprint to guide commodity division directors. Where a commodity is under the general ceiling price regulation (GCPR) or similar control and is selling at ceiling, the price level should be preserved. But OPS ominously suggests that even for some of the more important commodities that fall within this category "a cost study should be made looking toward a rollback." Where a commodity is under GCPR but selling well below ceiling, and where the ceiling represents a good advance above June, 1950, levels, serious consideration should be given to a tailored regulation rolling back ceilings to or toward present market levels.

Where a commodity is under CPR 22 or 30, says OPS in its standards, and ceilings are higher than GCPR, the tailored regulations should reduce ceilings to or toward the GCPR level wherever CPR 22 or 30 have yielded "inappropriate or excessively high ceilings."

Ignored—In the memorandum to commodity division directors, the OPS serves notice that it intends to continue to ignore some of the 1951 amendments—particularly the Capehart—in the Defense Production Act. Instances may occur, OPS notes, where individual adjustments required by the amended Defense Production Act would establish ceilings which vary from those in industry regulations drawn up in accordance with the standards in the memorandum.

"At this point," the agency says, "it is not present OPS policy to raise general industry ceilings merely to avoid or to recognize individual adjustments under the amended act."

Scrap Ceiling Prices Revised

Seeking to develop maximum collection and utilization of scrap with severe winter shortage threatening, Office of Price Stabilization amended its Ceiling Price Regulation No. 5. Changes in the schedule are effective at seller's option anytime between Oct. 23 and Oct. 30.

New ceilings are established for certain grades of dealer and industrial scrap. No. 1 bundles replace No. 1 heavy melting steel as the base grade for pricing scrap. Net result is to establish identical ceiling prices for No. 1 heavy melting grade, No. 2 heavy melting, and No. 2 bundles at a price $1 below that quoted on No. 1 bundles. The No. 1 bundles price holds unchanged.

By setting up No. 1 and No. 2 heavy melting grades at the same ceiling price, time and effort heretofore required for segregation are expected to be saved. Also, it is believed, upgrading will be effectively checked. Establishment of No. 2 bundles at the same price as No. 1 and No. 2 heavy melting will permit dealers to combine these grades in one shipment to fill a car and expedite movement.

The amended regulation reduces differentials on foundry steel $2 per ton, this being designed to discourage overproduction of this grade at the expense of open-hearth material.

By raising ceiling price for unprepared scrap suitable for compression into No. 2 bundles, by $2 per ton, and correspondingly increasing No. 2 bundles by the same amount, collection of remote and abandoned material by peddlers, auto wreckers, farmers, etc., is expected to be encouraged.

Disappointment

The super-priority DX symbol works fine when you get it, but the job is to get it

IT HAS BEEN DONE. You can pry loose a super-priority DX symbol from Washington to speed deliveries on vital components or non-CMP materials but often it's less trouble to

CLEANS THE AIR: Devoted mostly to subcontracting on defense work, Kirk & Blum Mfg. Co., Cincinnati, needed more room and recently moved into this 120,000 square foot building. Makers and designers of dust and fume collecting systems, the company has press brakes which can bend and form sheet steel up to three-eighths inch thick and 17-feet long, electrical seam welders and 250-ton forming presses

make shift somehow or other on your own to find the missing links for your company's product.

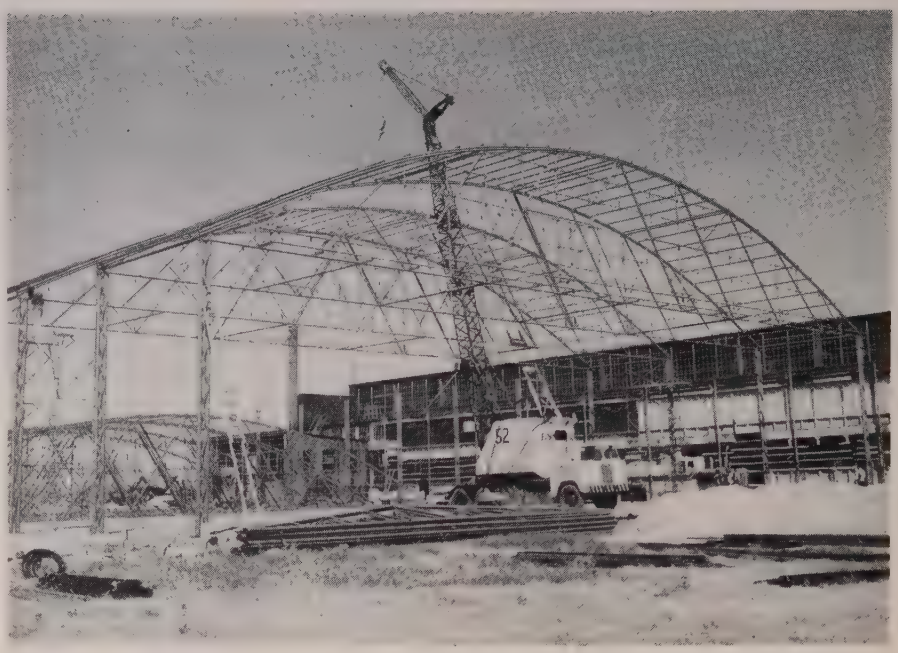
In a STEEL survey on the subject, a Detroit machine tool maker was one of the few companies found that was successfully using a DX rating. In spot checks—all made on companies with defense contracts and eligible to apply for the priority—the most common experience was that no attempt had been made to get a DX. Many companies reported they had applied for the rating but had been turned down.

Six Weeks Old—The action establishing the DX symbol was taken last Sept. 13. The rating was designed to break bottlenecks in urgent defense production programs. The DX can be applied by NPA to orders calling for products, components or materials other than steel, copper or aluminum when delay in delivery would jeopardize top-urgency defense programs. On Sept. 13 NPA cautioned that the symbol would be "strictly limited in use," confined largely to orders for basic programs for the Defense Department and the Atomic Energy Commission. Machine tool builders were singled out as one group of manufacturers for which the priority was designed.

The DX hasn't helped many machine tool makers. A typical reaction is this: "We can't use the priority until we're in a last-minute emergency. Then, should we get the DX, it comes too late." Even the Detroit builder that obtained a DX in time admits the job took a lot of doing. When it sought such authorization, its supporting data ran to several pages, but even then NPA checked everything and was extremely tough.

Big Help — The Detroit company and the others that have won a DX find that thus far it's highly effective, working much like the special NPA directives. The tool builder wanted spindles and quills. Delivery schedules on these with a DO rating was 8 to 9 months. Using the DX rating, the company was promised shipment in 6 to 8 weeks. Items for which DXs have been obtained include boring bars, special milling cutters for machining cast armor and components for making machinery used on jet engines and heavy ordnance. Handling of the DX rating is like that of DO. The order is certified as being issued against DX number such and such; if the vendor has any question about the buyer's right to use it, he can check with NPA.

When DX was first announced it was hailed as a lifesaver by many a hard-pressed defense contractor. Thus far, it has been a lifesaver for just a few.



ON-THE-SPOT OVERHAULS: C-54s are now being overhauled on a production line basis at Majors Field, Greenville, Tex. Built by Texas Engineering & Mfg. Co. Inc. at Dallas, the C-54s are flown to Greenville for delivery to the Air Force. This new production hangar at the Greenville installation will help Temco deliver C-54s on better schedule and will be completed by Nov. 15

Subcontractors Help To Smooth Out Defense Production

INEVITABLE dislocations in the defense production program have forced airplane makers to cut back the number of airframes they are building. The slash was necessary because not enough aircraft engines are being made to go into the airframes—an encouraging sign for subcontractors.

Changes in production goals or a bottleneck of particular items often require a quick supply of intricate subassemblies. That's where the facilities of subcontractors provide their key assistance. Right now, subcontractors might "point" toward a subcontract in the aircraft engine field.

One aircraft engine producer already subcontracting some if its work is Westinghouse Electric Corp. from its plant in Kansas City, Mo. A widespread group of subcontractors, ranging from industrial giants to virtually "one-man" shops aid in building Westinghouse turbojet engines. While jet engines for Navy and Air Force fighter planes come off the final assembly line only hours apart, many of the subcontractors are schooled in the production methods used and in ways to handle new and exacting materials.

Other wrinkles in defense production are being ironed out as Fisher Body Division of General Motors Corp. begins fabrication and assembly of Bullard Cutmaster vertical turret lathes under subcontract to Bullard Co., Bridgeport, Conn. Ryan Aeronautical Co., San Diego, Calif., will undertake a ten-fold increase in production of rocket motors for surface-to-surface missiles as a result of a contract from Firestone Tire and Rubber Co. of Los Angeles for such motors. Chrysler Corp., which is building a new plant near Detroit for making Pratt & Whitney J-48 jet engines, will now make tail and wing assemblies for the Douglas C-124 Globemaster II.

Contracts awarded by the government, in excess of $250,000, follow:

Product	Contractor
Precision Surface Grinders	Mattison Machine Works, Rockford, Ill.
Road Graders	Oxnard Heavy Maintenance & Mfg. Co., Oxnard, Calif.
Spare Items	Austin-Western Co., Aurora, Ill.
Passenger Busses	A.C.F. Brill Motors Co., Philadelphia
Furniture	Doehler Metal Furniture Co. Inc., New York
Vegetable Steamers	Market Forge Co., Everett, Mass.
Immersion Heaters	Sterling Mfg. Co., Omaha, Nebr.
Moving Stairway Equipment	Westinghouse Electric Corp., Pittsburgh.
Components for Bomb Cluster	Shwayder Bros. Inc., Denver
Auxiliary Detonating Fuzes	Talon Inc., Meadville, Pa.
Tail Covers	Rudy Mfg. Co., Dowagiac, Mich.
Bomb Fuze Assemblies	Royal Vacuum Cleaner Co., Cleveland Chicago Electric Mfg. Co., Chicago
Generator Sets	Buda Co., Harway, Ill. Detroit Diesel Engine Div., General Motors Corp., Detroit

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

RUBBER—Amendment of Oct. 18, 1951, of NPA Order M-2 removes synthetic rubber residue from government allocation.

THIOKOL—Schedule 10 to NPA Order M-45 extends government allocation to Thiokol, a synthetic rubber-like plastic material used in producing self-sealing gas tanks for airplanes and as a ship caulking compound. Schedule 10 was effective Oct. 19, 1951.

STEEL—Four obsolete supplements to NPA Order M-1 (steel) were revoked Oct. 22, 1951. They are: Supplement 1, which provided defense ratings for steel for the U. S. freight car program; Supplement 2, which covered steel supplies for Great Lakes vessels; Supplement 3, which provided priority assistance for the Canadian freight car program; and Supplement 4, which gave priority aid for repair and conversion of seagoing vessels. Steel for all four programs is provided now by allotments under the Controlled Materials Plan.

Controlled Materials Plan

DEADLINE FOR ADJUSTMENT — Amendment of Oct. 22, 1951, of Direction 7 to CMP Reg. 1 and amendment of Oct. 22, 1951, of Direction 3 to CMP Reg. 6 set Oct. 31, 1951, as the deadline for canceling or reducing outstanding orders for steel, copper and aluminum so that third-quarter orders not delivered on or before Oct. 7, 1951, plus fourth-quarter orders do not exceed authorized fourth-quarter allotments.

NPA Regulation

INVENTORIES—Amendment of Oct. 22, 1951, of NPA Reg. 1 and amendment of Oct. 22, 1951, of Interpretations 1, 2 and 3 of NPA Reg. 1 tighten inventory controls. Amendment of Reg. 1 limits inventories of a greater number of products and materials than were covered heretofore, provides a more specific definition of items in inventory to include many materials formerly classified as "in process," and lists in the regulation all existing inventory controls of other NPA orders and regulations. Interpretations 1, 2 and 3 merely change the method of identifying references to portions of the regulation without affecting either the character of the regulation or the interpretations.

Price Regulations

SULPHURIC ACID—Amendment 3 of Supplementary Regulation 12 of Ceiling Price Regulation 22 permits makers of sulphuric acid to price it under the General Ceiling Price Regulation while pricing their other products under Ceiling Price Regulation 22. Amendment 3 was effective Oct. 24, 1951.

LEAD—Amendment 1 of Ceiling Price Regulation 53 permits an increase of 2 cents a pound in the ceiling price level for lead scrap materials, secondary lead and antimonial lead, effective Oct. 22, 1951. This increase is to maintain the price relationship of these lead materials with primary lead. A ceiling price increase of 2 cents a pound was authorized for primary lead on Oct. 2.

ZINC SCRAP—Amendment 1 of Ceiling Price Regulation 43 authorizes ceiling price increases for zinc scrap. Unsweated zinc dross and zinc die-cast slabs ceilings are increased 1.5 cents a pound, and ceilings on all other grades

PAPER THIN PLUS: Chief advantage of this Sendzimir cold roll mill is its ability to accommodate strips up to 8½ inches wide. In operation at the Magnetics Division, U.S. Naval Ordnance Laboratory since late October, the mill is also capable of rolling metals down to one-tenth the thickness of a human hair for uses in pulse transformers, magnetic amplifiers, radar equipment and other high frequency applications

of zinc scrap are increased 1 cent a pound, effective Oct. 22, 1951. These increases are to maintain the price relationship of these zinc materials with slab zinc, the ceiling price for which was increased 2 cents a pound Oct. 2.

REMELT ZINC—Amendment 1 of Supplementary Regulation 48 to the General Ceiling Price Regulation authorizes increases in price ceilings on remelt zinc. The increase for remelt zinc with a minimum zinc content of 97.5 per cent and in quantities of 10,000 pounds or more is 2 cents a pound, while the increase for zinc content of less than 97.5 per cent is 1.75 cents. These increases are to maintain the price relationship of these zinc materials with slab zinc, the ceiling price for which was increased 2 cents a pound Oct. 2.

Aluminum Controls Modified

Restrictions on carryover of third-quarter orders for aluminum have been modified by the National Production Authority.

Early this month NPA announced that any third-quarter order for aluminum not shipped by Oct. 7 would have to be charged against fourth-quarter allotments or be cancelled. Now NPA is authorizing aluminum producers to ship materials produced against third-quarter orders which could not be and were not diverted to fourth-quarter authorized controlled materials (ACM) orders.

A number of third-quarter carryover orders that were not put in process or diverted to fourth-quarter ACM orders were washed out. Remaining, however, is a considerable number of carryover orders in process which could not be diverted and for which no fourth-quarter ACM orders have been placed.

As a result, possibly 25 million pounds of aluminum products have been unshipped and practically immobilized.

If mills ship materials produced against third-quarter allotments not converted to fourth-quarter ACM orders prior to Oct. 7, they must provide NPA with certain information about the shipments. This will enable NPA to review these shipments.

Producers are also directed to cancel fourth-quarter ACM orders up to a quantity equivalent to that shipped after Oct. 7 against third-quarter orders from the same customers.

Before making cancellations, producers must notify the customers.

Don't Try It

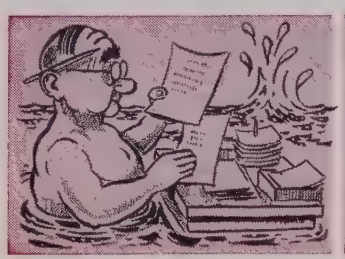
You can't buy office supplies and equipment under construction allotments from the Controlled Materials Plan.

Some people, the National Production Authority reveals, have been interpreting the term "production equipment" in the CMP construction regulations as office supplies and equipment and business machines.

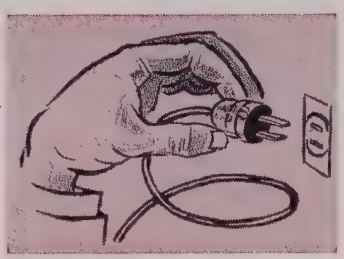
Office supplies and machinery are neither production equipment nor production materials, NPA says, so it is improper for holders of 4C (construction) allotments to use rated orders to obtain such supplies and machinery.

Windows of Washington

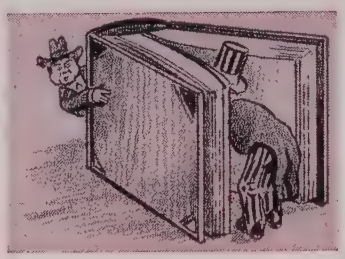
By E. C. KREUTZBERG *Washington Editor*



COOL QUARTERS FOR SDPA
. . . space at a premium



PLUG IN THE FARMS
. . . 850,000 without electricity



CONTRACTORS' BOOKS
. . . government gets a look

WILDCATTING FOR SLAG
. . . in locomotive repair shop

WASHINGTON AGAIN is suffering an acute attack of its perennial disease—overcrowding.

This time the government, despite its huge inventory of office and other space, is in a jam. When Telford Taylor took over as head of the new Small Defense Plants Administration the best the Public Buildings Administration could do was get him quarters in the YMCA building—pointing out as a compensating advantage that the building has a swimming pool which will help a lot next summer.

On the Spot—Best example of the pressure was inability of the Wage Stabilization Board to find hotel accommodations and a meeting place for a conference with its 14 twelve-man regional wage stabilization boards, Oct. 22-24. WSB solved the dilemma by holding the conference in the Hotel New Yorker in New York.

Very few hardship cases are reported by visiting businessmen. They have had enough experience to know that it isn't safe to come to Washington these days without making hotel reservations in advance.

Auditing Aid . . .

Under the Hardy bill (passed by Congress just prior to adjournment) companies working on negotiated government contracts will be compelled to open their books upon request of the Government Accounting Office for purposes of audit. Nine out of ten contractors willingly disclose all information asked for; the Hardy measure makes such co-operation mandatory for all. The bill is an amendment to the Federal Property and Administrative Services Act of 1949 and the Armed Services Procurement Act of 1947. It applies only to contracts placed after negotiation, without advertising and competitive bids. Contrary to widespread fears among businessmen during the hearings, the Hardy amendment will not affect the finality of renegotiation settlements; decisions of the Renegotiation Board cannot be upset short of proof of fraud.

A Going Concern . . .

Mangaslag Inc. is the name chosen by Sid W. Richardson for his manganese-from-slag enterprise (STEEL, Aug. 27, p. 44). The Ft. Worth, Tex., oilman has established headquarters in Washington and is prepared to move just as fast as government red tape will permit him.

Mr. Richardson has to have approval by, priority assistance from, and contracts with no fewer than nine separate government agencies —so it will take time to cut through this tangle. Mangaslag's pilot blast furnace may be located at Pittston, in the anthracite district of Pennsylvania; Lehigh Valley Railroad has placed at his disposal its old locomotive repair shop there. The pilot furnace will use anthracite coal from nearby mines, and manganese-containing slag from open-hearth furnaces in Pennsylvania. Product is to be between 100 and 150 tons of 20 per cent spiegeleisen per day. That subsequently will be converted into standard 80 per cent ferromanganese.

Electrical Market Untapped . . .

A big market for electrical equipment and appliances remains untapped. The Department of Agriculture says that more than 850,000 American farms—16 per cent of the total—are not equipped with electricity.

Rural electrification has shown "a substantial increase" since 1950, says the department. The program is being continued. Some 4,522,637 farms in the U. S. are already connected to power lines.

Posing a Problem . . .

Accelerated amortization on plant and facilities expansion under certificates of necessity is posing a problem to contractors: How much of it can they charge as cost under a negotiated government contract? Task of drawing up an answer to this question has been turned over to James F. King, newly appointed DPA deputy administrator in charge of resources expansion.

The only rule so far laid down is that in Defense Mobilizer Charles E. Wilson's directive of Aug. 14, DMO 11, which says: "Accelerated amortization shall be allowed (as government costs) only to the extent that the percentage certified is based on an estimate of post-five-year-period usefulness. Percentages of amortization attributable to other incentives shall not be included as an element of cost in contract pricing."

Within the above definition Mr. King is to draw up a formula for determining the fine line separating the percentage of total cost that is chargeable against the emergency in the 5-year period and the percentage denoting post-emergency usefulness. The formula, of course, will help only in determining amortization costs under contracts. It will have no validity whatever in connection with charging off amortization in tax returns.

Record European Steel Output Likely

Peak production in the first half may make 1951's performance an alltime high. Performance in the second six months is not so good because of material shortages

EUROPE'S steel production in the second half of 1951 is dropping, but total output this year may set a record because of the peak performance in the first six months.

Holidays in December and mounting materials shortages are hampering production in this half.

U. K.: Steady—Figures developed by the Economic Commission for Europe indicate that ingot steel production increased in the first half of this year, compared to 1950, for all major producers except the United Kingdom, where output remained level (see the table). If the first half

Europe's Ingot Production
(in thousands of net tons)

Country	1950	First 6 mos. 1951 (annual rate)	1951 (6 mos.) as a % of 1950
Austria	1,037	1,090	105
Belgium	4,165	5,511	133
Denmark	135	169	125
Finland	113	152	134
France	9,515	10,721	113
Saar	2,089	2,781	133
West Germany	13,333	14,172	106
Italy	2,598	3,208	123
Luxemburg	2,696	3,320	123
Netherlands	539	594	111
Norway	77	79*	103
Poland	2,767	2,985*	108
Spain	900	891*	99
Sweden	1,605	1,665	104
Trieste	43	65	151
United Kingdom	18,211	18,225	100
Total	59,823	65,648*	110

* Estimated

pace could be maintained, some 10 per cent more steel than in 1950 would be turned out during 1951 in 16 European areas. Apart from certain small-producing countries, the upward trend is particularly noticeable in Belgium, Luxemburg, the Saar and Italy, where the production rate was 25 per cent higher than in 1950.

The statistics of foreign trade in raw materials reflect a substantial increase in the iron ore imports of Belgium-Luxemburg and iron ore exports of France, the gains in both cases accounted for largely by greater ore trade between Belux and France. The imports of scrap into Italy also increased. Germany's exports and the U. K.'s imports of scrap have sharply declined, a factor which accounts considerably for the leveling off of steel production in the latter country.

U.K. May Miss the Target

British steel production in September was at an annual rate of 17,639,000 net tons, a marked improvement over the August rate, but still below production in September, 1950.

The United Kingdom is in danger of missing its production target this year of 17,920,000 tons. To hit it, the nation's mills will have to produce at the rate of 19,170,000 tons.

The index (1948 = 100) of the real national product in the U. K. from 1946 through 1950 is estimated to have been 94, 95, 100, 105, 108. Manufacturing output, which accounts for more than one-third of the total weight, rose from 87 in 1946 to 115 in 1950, but the increase over the entire period in agriculture (from 90 to 97) and in mining (from 91 to 104) was less than the rise in the total index. The index for agriculture rose from 90 in 1946 to 106 in 1949, but then skidded in 1950.

French Production Slips

French steel production reached 854,000 net tons in September, an annual rate of 10,248,000 tons that's slightly below the annual rate achieved in the first half.

More stringent coal supplies are one reason why ingot production has slackened from the first half rate.

Good steel production has permitted record output of automobiles in France. In the first seven months of this year, French factories turned out 265,326 vehicles, 96 per cent more than assembled in 1938. In the same period of 1950, 200,413 units were built. Of the 265,000 vehicles, 187,737 were cars and 77,589 commercial vehicles.

Citroen is reported preparing two new types of cars, a 12 CV and an 8 CV. The former will be ready within a year and is destined to compete with Renault's Frigate and Ford's Comet. Its price will be more than 1 million francs ($2800). The 8 CV will cost between $1700 and $2000 and get 33 miles to a gallon of gas.

Ruhr Steel Investments Slump

Gross investments of the iron and steel industry of Western Germany since the end of the war are estimated at only 400 million marks, according to the German Steel Association.

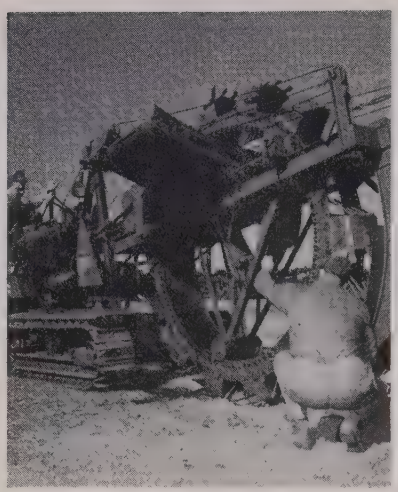
France has invested 1.5 billion marks since 1947; Great Britain 2 billion marks. France, in addition, intends to sink another 1.75 billion marks into the industry by 1953.

If Western Germany wins approval to expand her steel plants, the August Thyssen works will probably gain first attention. The Germans want permission to spend 67 million marks on the plant to boost its present controlled output from 128,000 net tons annually to 1.1 million tons.

Coal shortages are the most serious drawbacks to full utilization of the Ruhr's present steel potential. Some 22 per cent of current ingot production is accounted for by U. S. coal shipments to the nation. Much of the coal is going to Germany in exchange for German steel, a practice that may be curtailed by order of the Bonn government.

LONG BUSINESS TRIP: Managers of E. W. Bliss Co.'s British and French plants, A. E. Whyman (left) and R. Rivolta (right), recently arrived in America to visit the company's works in Canton, Toledo, Salem, O., and Hastings, Mich. Bliss' British and French plants are producing a wide range of mechanical and hydraulic presses for defense production

WELL DRILLING RIG



TRENCH DIGGERS

BRIDGE PONTOONS

MOBILE REPAIR SHOPS

Sell It to the Seabees

A host of metalworking products are used by the Navy's construction and maintenance arm in a variety of operations at far-flung bases

BUILDING and maintaining the Navy's advance bases overseas requires modern tools built by the metalworking industry. That's why the Seabees (Mobile Construction Battalions under command of the Navy Civil Engineering Corps) are a good potential market—perhaps unexplored by you—for many types of equipment and machinery.

Seabee units combine experience and know-how of 60 different construction and maintenance trades. Their primary specialties are roads and airstrips, piers and harbor works, fuel and ammunition storage, power generation facilities and hospitals. And that's only the beginning. Seabees know how to set up and maintain communications systems, unload ships over pontoon type piers, locate and tap water sources and erect Quonset huts—to name just a few jobs. These operations are duplicated across wide expanses of water at isolated island bases and shore establishments as well as in amphibious operations. A wide variety of supplies must be available for their use.

Drop in the Bucket—Current procurement is not based on requirements of a major war, but preparedness policy (and Korea) requires that the most modern equipment for construction and repair needs be on hand. Navy's Bureau of Yards and Docks (it handles Seabee procurement) is now embarked on a two-year $300 million equipment-buying program. In event of another major war, buying would be measured in the billions —and a staggering amount of equipment would be needed quickly. The Seabees maintain a war reserve stock of equipment that they've been adding to for some time; this can't be tapped unless a big war breaks out.

Principal items of Seabee heavy construction equipment are cranes, tractors, trucks and mobile equipment of various types, scrapers, rollers, graders and crushers. To put this equipment to proper use and keep it operating, thousands of other products are needed. Welding equipment and mobile machine shops with a variety of hand and power tools rank high on the procurement list. Winches and hoists, conveyors, wire rope and slings, power generating systems, ladders, pipe and surveying instruments show the wide divergence of equipment used.

Build a Better Mousetrap—Military modifications of conventional construction and maintenance equipment give would-be suppliers to the Seabees plenty of leeway to develop special products for their use. Mobility is a prime requisite, with its corollary of light weight. The latter is becoming increasingly important as much equipment must be transported by air. Emphasis is on durability under combat conditions and smooth operation in any climate or terrain of the world.

Typical of Seabee developments are a diesel-powered pile driving hammer and a power grader adopted as standard for the Navy. The power grader, model CB-88, was developed for airborne transportation and weighs only 17,025 pounds, about 2½ tons less than its commercial counterparts. Built by Austin-Western, it's powered by an 80-horsepower 3-cylinder GM diesel engine and can maneuver in small areas and negotiate steep slopes or sidehill grades. The CB-88 develops 45 per cent greater tractive effort with 20 per cent less horsepower than conventional tandem-drive graders. The pile-driving hammer is a self-contained unit weighing only 5½ tons. It delivers 16,000 foot-pounds of energy at a rate of 83 blows per minute, and requires no auxiliary equipment other than a crane and driving leads.

Toys Boom Despite Metal Lack

Some $330 million worth of toys have already been shipped this year to retail outlets, and the total 1951 volume promises to surpass the 1950 level by $30 million.

That's the word given by Toy Manufacturers of the U.S., based on a survey just made of producers and retailers. The record-breaking toy volume will probably fall well below demand before Christmas, especially on metal items. The metal shortages have hit the industry and partly account for a 20 per cent gain in plastic applications over last year. An estimated $50 million worth of plastic toys will be produced in 1951. Output of wooden toys has also increased.

About 45 million children of toy-using age are in the U.S., 40 per cent over prewar years. "Many manufacturers report that they could have sold 20 to 50 per cent more merchandise if materials had been available," the association says.

Sulphur, Iron from Copper Waste

Brown Co., a pulp and paper-making firm at Berlin, N. H., is going to salvage scarce sulphur from copper-mine waste ore—and in the process also recover iron.

Brown is building a $500,000 plant to take waste from the Vermont Copper Co. mine at Stratford, N. H. The company has contracted for 27,000

tons of waste a year, from which it expects to get the equivalent of 9000 tons of sulphur. Waste pyrrhotite is put through a door plant which causes it to give off sulphur dioxide gas. The gas is piped into the liquor system of the paper plant for cooking pulpwood. Iron is left and is sold to steel companies. The plant will be running by next February or March.

Windfall For Weldments

Lag in casting deliveries puts welcome load on makers of welded assemblies

WELL-FILLED order books and high backlogs of foundries, particularly steel, are causing a bonanza for makers of weldments—assemblies whose component parts are joined by welding.

Extended delivery dates on castings are giving this industry another opportunity for development such as it enjoyed during World War II, and it's making the most of it. Some weldment applications — improvised during the war as a substitute for castings—still prevail today as standard procedures. Weldment makers concede that competition with castings is limited to certain sizes and types of parts. Small castings turned out in large numbers are generally cheaper than weldments because pattern costs can be readily absorbed on production runs. For large units, particularly specialties in small numbers, the edge is often in favor of weldments. And there are few limitations as to what steels can be welded, or to the welding of steel for ferrous castings.

Categorized—Defense work in many cases has put jobbing weldment shops on a production basis that normal civilian demand doesn't permit. Jobbing shops make up about half of the 150 job and captive shops producing weldments as a major occupation. This number is confined to ferrous metals; there are relatively few in the nonferrous field.

Some of the jobbing shops are borderline companies, in that they cut or burn light plates to shape. While their product is often termed weldments, they do little in design and engineering. True weldment shops utilize heavier plate and build up shaped structures to design.

The Payoff—Because of increased business from customers normally favoring castings, and partly because of stronger demand from regular customers, the industry is happily counting up what will be a banner year in volume. A typical New England non-integrated shop has doubled last year's business already. A captive shop in Chicago says its volume has increased at least 150 per cent. Other makers report more modest gains, but sales for the entire industry will be well over 1950 and several times the pre-war volume.

While defense needs have mushroomed weldment applications, they have also sidelined much of the normal civilian business. Purely defense business accounts for about 85 per cent of one Detroit weldment maker's current volume. Several other shops in that area specializing in machine bases are booked 100 per cent with defense-support work (just ten months ago, it accounted for less than one-third of all orders). In general, defense gets only about 15 per cent of the industry's output. But when combined with support programs, the total is well over half.

In The Act—Diversity of weldment use is wide. Heaviest volume of orders currently pouring in comes from oil refineries, general fabricators, tank-automotive and aircraft industries and machine tool builders. Other uses are locomotives, diesel engines, earthmoving and roadbuilding machinery, agricultural and mining equipment, chemical processing, paper making machinery and turbine equipment. In fact weldment uses cut across the ferrous metalworking industry.

Jet engines and electronic equipment are relatively new applications for welded assemblies. Heavy capital goods industries appear to be leading toward broader utilization of weldments and the trend seems to be toward heavier weldments. On the other hand, designers in studying stresses are devoting more and more attention to the low alloys, particularly for fabrication of boilers and pressure vessels and tanks, which may mean a trend toward lighter weight.

HEAT'S ON WELDMENT MAKERS
. . . applications are mushrooming

Necessary Ingredients—Production schedules are being readjusted because of limited steel plate supply. Scarcity of skilled welders is another brake on production. Other workers are plentiful but one company claims that quality of new workers offering their services is low.

Titanium Metal Output Starts

First actual production of titanium metal at the newly constructed Henderson, Nev., plant of Titanium Metals Corp. of America has started.

This company, owned jointly by National Lead Co. and Allegheny Ludlum Steel Corp., will expand output until a rate of ten tons a day is reached late next year. This will be equivalent to eight times the present world production of titanium metal.

Warehouse Stock List Unit Meets

Pacific Coast distributors of aircraft stainless and alloy steels will meet with aircraft manufacturers' representatives October 29 and 30 in Los Angeles for their sixth annual warehouse stock list committee conference. Purpose of the conference will be to refine and further reduce the recommended warehouse stock list of the various sizes and types of steels maintained by Pacific Coast distributors for servicing requirements of aircraft manufacturers.

By standardizing types, sizes and alloys of steels to be stocked, warehouses in years past have been able to reduce quantities and varieties of raw material by as much as 50 per cent, while not materially reducing the value or weight of stock they kept on hand.

The warehouse stock list project is sponsored by Northrop Aircraft Inc., Hawthorne, Calif., as a subcommittee of the National Aircraft Standards Committee under the Aircraft Industries Association.

Quebec Considers Refinery

A proposal to build a $10 million nonferrous refinery in Quebec, Canada, has been laid before the province government by Harold Knight, president of Barvue Mines Ltd., which hold rights to zinc deposits in northwestern Quebec.

From Bumper to Tailgate...

N-A-X HIGH-TENSILE STEEL

Reduces Deadweight and Increases Durability

The widespread use of N-A-X HIGH-TENSILE steel in transportation equipment emphasizes two vital characteristics of this high-strength low-alloy steel.

1. *Strength with less deadweight.* N-A-X HIGH-TENSILE steel reduces deadweight . . . of great importance in transportation equipment and military vehicles.
2. *Exceptional durability.* N-A-X HIGH-TENSILE steel, with its high strength and toughness, has proved greater resistance to fatigue and impact at normal and sub-zero temperatures. Its inherent structure and composition greatly reduce the effects of abrasion and corrosion.

The response of N-A-X HIGH-TENSILE steel to severe cold-forming operations and its excellent weldability by electric arc or resistance, atomic hydrogen or heliarc, and all other processes, are added important characteristics of N-A-X HIGH-TENSILE steel.

The "Eager Beaver"

The use of low-alloy, high-strength steels in military equipment assures longer life with less deadweight.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Willys-Overland is coming out with a conventional passenger car. It will probably be in the same weight class as the Nash Rambler but nearly as long as the Plymouth Concord

DETROIT

WILLYS-OVERLAND has had almost as many ups and downs as an elevator.

Its predecessor company had been the No. 2 producer of automobiles pre-World War I, but came out of the war in 26th place. Its World War II product, the Jeep, carved for itself a prominent niche in motordom's hall of fame, but few civilians wanted one as their regular means of transportation. The company has had to content itself since World War II with producing for what it considers to be 10 per cent of the automotive market, making jeeps, station wagons and light trucks.

Change — Looking out a sixth floor window to the employees parking lot below which contained only a handful of the company's products, one of the W-O people last week said "We're finally going to be able to change that." He had in mind the new passenger car Willys has begun producing.

It has been believed around automotive circles for considerable time that Willys was planning to bring out a passenger car, but nobody in the company was talking—until Willys President Ward M. Canaday gave official word.

A Matter of Details—Details of the car are not being released yet, the company waiting until enough cars have been produced to supply its dealers. "We hope," says Mr. Canaday, "this can be accomplished before year-end." But in making an announcement of production and merchandising plans for next year, Mr. Canaday said: "It is considerably larger than I believe is generally anticipated, with wheelbase and overall length being closely similar to the industry's volume leaders. Interior passenger space is comparable to that of the most costly automobiles on the road."

The power plant for this car leans heavily on present Willys' design, being a six-cylinder F-head, with what is reportedly 7.6 to 1 compression ratio and 90-hp. It has, says Mr. Canaday, "the highest horsepower per cubic inch of piston displacement for any full-size production motor, thus accounting in part for record mileage in road tests of up to 35 miles to the gallon at a sustained speed of 30 mph and proportionate fuel savings at higher speeds." Important feature these days is that this engine is designed to use regular gas. One of the factors which convinced the government to authorize materials for the car, according to Mr. Canaday, is "its revolutionary construction along areo-dynamic lines which conserves materials and gas by elimination of needless weight."

Inference — The inferences in these remarks and from "Barny" Roos' SAE talk earlier this year (STEEL, Apr. 9, p. 59) are that the new Willys is to be about in the weight class of the Henry J and Nash Rambler but will be only slightly shorter than the Plymouth Concord, which measures 188 inches overall. Had all cars built last year been in the 2500-pound class, said Mr. Roos, 2,470,000 tons of steel and 620,000 tons of cast and malleable iron would have been saved, or enough for production of an additional 2,360,000 automobiles. The reference to "revolutionary construction along aerodynamic lines" would seem to indicate that the body and chassis are built up like Nash and Hudson with an integral frame.

Production of the new car, it appears, can be added to Willy-Overland's output without encroaching on its other lines. Few companies, Mr. Canaday explained, get the opportunity to bring out a completely new car, the cost of unamortized tools making drastic changes from year to year prohibitive. For Willys, without a conventional passenger car, there was not the same kind of a problem, although research, development and tooling for the automobile cost $10 million. It will be

HEAVY CONTRIBUTION: One of the largest single pieces of scrap uncovered in the current scrap drive in General Motors plants is this 95-ton hammer anvil from the Oldsmobile Forge Plant. The huge 190,000-pound piece of cast steel required a special crew to move it to the railroad siding, where it was transferred to a heavy-duty flat car; one of only a dozen existing in the U. S.

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produced in space not required for utility car manufacture, and will mean no curtailment of utility car turnout, nor scrappage of tools.

Mixed — Starting from scratch, however, is a mixture of blessings and troubles. Not wedded to a particular size and unburdened with preconceived notions, the company nevertheless has had a tough time trying to decide how it could execute a design that would not be obsolete before it could be put in production and at the same time avoid producing a freakish car which buyers would avoid like a plague. One of the sources of good timeless automobile styling is Italy, W-O planners believed, and the new car undoubtedly will depend on good line in the Continental way rather than extensive bright work for its verve. Another problem was to provide in this car and its engine the capacity for improvement. Though Mr. Canaday says: "We have been able to adapt the most ideal engineering and design principles to every last detail of construction of the new Willys," he undoubtedly wants to be able to modify it periodically as the whole industry has to do even with their best designs so that the "new" stays that way.

A subject of considerable speculation until the official announcement is made will be the price tag the new car will bear. Volume, of course, is the all-important consideration, and it is believed Willys would be thinking in terms of turnout of 500 of these cars a day if the materials situation were not topsy-turvy.

At press time OPS had not issued retail ceiling prices for the new models but on the basis of factory wholesale prices established by the government agency the new cars will probably initially list upwards of $1800.

New Styling for the Jeep

While readying its passenger car for introduction, Willys has also been busy changing the jeep.

The postwar model embodied many changes, probably the most significant of which was the complete waterproofing of the engine and radio. The newest one, however, goes several steps further, principally in the direction of passenger comfort. Its seats are larger, better padded. Longer rear springs are used and the vehicle overall is longer. Although still unmistakably a jeep in appearance, its sides are without projections and the windshield construction and hinging has been revamped to allow room for a defroster.

Smarting under the statement made in the public press that the Navy is able to buy Cadillacs for less than it presently gets jeeps, some W-O people have told outsiders that $2800 buys a jeep and question whether Cadillacs come that cheaply.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	491,608*	760,847
October	.....	796,010
November	.....	833,784
December	.....	671,622
Week Ended	1951	1950
Sept. 29	113,973	187,030
Oct. 6	112,868	174,234
Oct. 13	120,543	174,234
Oct. 20	121,246	188,323
Oct. 27	120,000*	188,200

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Willys Builds Novel Army Unit

Another military vehicle developed by Willys, but still undergoing experimentation by Ordnance, is a midget cargo carrier capable of carrying the contents of a light truck through terrain and ground conditions which would be impassable for a larger vehicle. Dubbed the "Jenny," and looking like no previous vehicle, with a flat top and four over-size high-flotation wheels underneath that top, it can climb a 60 per cent grade, has four-wheel drive and steering, is operated from a tiller which can be rotated so that the driver walks if there is no room left for him. Capable of carrying 800 pounds, the vehicle itself weighs only 540 pounds. It has a speed range of 2 to 35 mph.

Wanted: Substitute for Copper

A substitute for copper in automobile radiators has been too long in coming, some new car buyers are learning. Discovering rust spots all over the radiator tank, an owner of a four-month-old medium-priced car found that the tank was painted steel and had rusted completely through. He hit the roof when he learned that a cheaper car, made in greater volume, still has a brass tank. The copper-clad steel radiator experimentally made by Willys-Overland, which created a stir in Washington when it was displayed there, does not reportedly satisfy the industry.

GM Practices What It Preaches

First plant designed in toto along General Motors' C. E. Wilson's outline of dual-purpose facilities (STEEL, Oct. 15, p. 57) is to be constructed by Buick-Oldsmobile-Pontiac Assembly Division of GM at Arlington, Tex. For its military work, the plant will make a Grumman-designed plane for the Navy, tooling to start immediately. B-O-Ps can also be assembled simultaneously if output is permitted. Completion of the facility is scheduled for early 1953.

What's Used for Finishes?

If you have been curious as to what materials and finishes are being used for the exterior bright work of present production-line cars, one major maker has compiled a listing, circulating it through its service organization to make sure each part receives the proper care.

Stainless steel is used for the body belt moldings, windshield and rear fender reveal moldings, fender moldings, lower body sill moldings, hood top moldings, radiator grille horizontal bars, windshield wiper arms, large wheel covers, and door lock covers. Chrome plating is used on bumpers, bumper guards, door handles, truck handles and hub caps. Chrome plate protected with a baked-on colorless enamel is used for the parking and tail light bezels, hood ornament, vertical grille bars, name plates, division strip in windshield, headlamp rims and license light housing.

The Business Trend

Defense-linked industries will be busy for a long time to come as new orders still outstrip deliveries. Consumer goods production picks up slightly

HARVEST TIME for armaments is still a long way off.

Orders are being written faster than end products can be delivered and will be for some time. So long as new orders for arms surpass delivery rates, backlog will pile up, leaving still more to be done. Orders are currently going out at a rate of over $4 billion a month; deliveries aren't quite half that amount.

Obligations for hard goods—products of metalworking industries—have made up more than half the total expenditures to date. It takes time to produce the complex weapons of modern armies. But every new or retooled plant going into operation is adding to the pyramid of materiel. Deliveries may overtake new orders by this time next year as schedules call for doubling of arms output by then.

Production is still going strong in defense-linked industries, picking up in most consumer lines except automobiles. This is evidenced by components of STEEL's industrial production index. Auto production is about 40 per cent under year-ago marks, while steelworks operations and electric power output have stayed at record heights. Freight car loadings are slightly under last year's levels but should be high for the rest of the year. STEEL's industrial activity index was pegged at 213 per cent of the 1936-1939 average in the week ended Oct. 20, down one point from the week before.

Strikes in Steel...

Cause of the drop in the activity index was a lowered rate of operations in the steel industry. Scattered strikes in the week ended Oct. 20 forced some production losses, but didn't sink the national operating rate below capacity. Steel mills were expected to make up the losses in the week ended Oct. 27 by toiling at their highest level in four months. Yield was calculated by American Iron & Steel Institute to be 2,057,000 net tons of ingots and steel for castings.

4.4 Million Autos in '52?

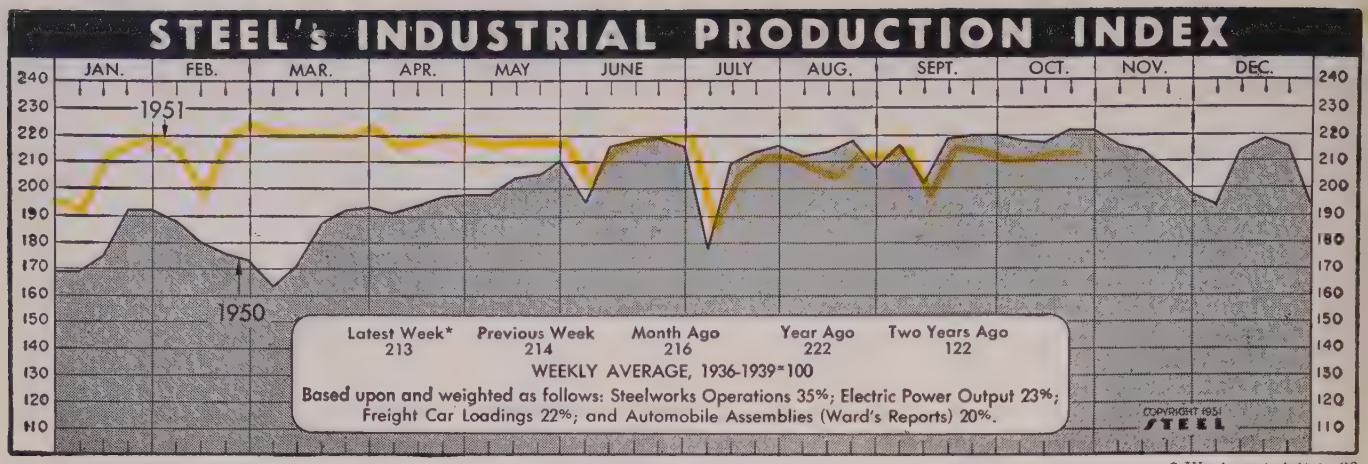
Little hope is seen in the auto industry for a materials ease before next July, says *Ward's Automotive Reports*. Next year's yield of U. S.-built passenger cars is expected to reach 4.4 million—with luck. That would be about 2 million less than 1950 and 1 million less than 1949 or 1951's predicted turnout, but better than any other year before. Weekly schedules in U. S. and Canadian plants were steady in the week ended Oct. 20. Passenger auto and truck completions totaled 121,246 units, about 700 more than were assembled the week before. Supplier strikes in progress or being threatened may pose big problems for automakers before cold weather sets in.

Sales Up, Profits Down...

That retroactive tax increase passed by Congress is changing the profits estimate of many metalworking companies. General Electric Co. is a good example. Its sales for the

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	100.5	101.5	101.0	102.0
	Electric Power Distributed (million kilowatt hours)	7,149	7,160	7,014	6,503
	Bituminous Coal Production (daily av.—1000 tons)	1,828	1,811	1,810	1,929
	Petroleum Production (daily av.—1000 bbl)	6,325	6,329	6,298	5,072
	Construction Volume (ENR—Unit $1,000,000)	$195.2	$220.7	$232.4	$260.7
	Automobile and Truck Output (Ward's—number units)	121,246	120,543	135,015	188,323
	* Dates on request. † Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car loadings (unit—1000 cars)	872†	869	864	891
	Business Failures (Dun & Bradstreet, number)	157	126	160	165
	Currency in Circulation (in millions of dollars)‡	$28,385	$28,448	$28,140	$27,228
	Department Store Sales (changes from like wk. a yr. ago)‡	+5%	−2%	−10%	+11%
	†Preliminary. ‡ Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$15,381	$14,856	$18,734	$15,431
	Federal Gross Debt (billions)	$257.0	$257.0	$256.8	$256.7
	Bond Volume, NYSE (millions)	$15.5	$12.4	$14.2	$17.7
	Stocks, Sales, NYSE (thousands of shares)	9,365	7,445	10,180	10,883
	Loans and Investments (billions)†	$71.1	$71.2	$70.7	$68.7
	United States Gov't. Obligations Held (millions)†	$30,849	$30,878	$30,722	$33,358
	† Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	157.62
	STEEL's Nonferrous Metal Price Index‡	234.9	234.9	224.6	226.5
	All Commodities†	177.7	177.4	176.4	168.9
	Metals and Metal Products†	190.9	190.9	189.4	178.3
	† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100. †† 1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 213
Previous Week 214
Month Ago 216
Year Ago 222
Two Years Ago 122
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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* Week ended Oct. 20

first nine months ($1.7 billion) were 25 per cent higher than in any previous comparable period. Pre-tax earnings were up 36 per cent. Because of an increase of 105 per cent in the provision required for federal income taxes, net profit earned in the first three quarters was 24 per cent less than last year's. For most companies, extra taxes will make second-half profits nose-dive.

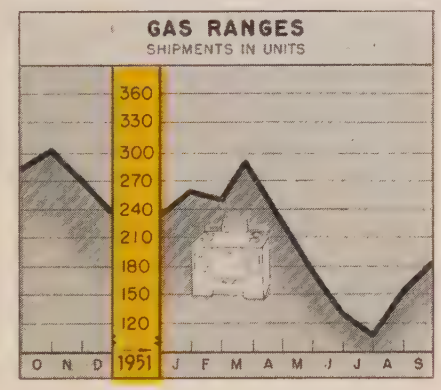
Homes Pass Government Goal...

The government's goal of 850,000 new housing units for 1951 was reached in September, with three months yet to be counted. Homebuilding in the first nine months of the year was well above 1948 and 1949 levels but 23 per cent under the record attained in 1950 for the same period. September saw 91,000 permanent nonfarm dwelling units started, a gain of 7 per cent from August. Bureau of Labor Statistics attributes the strength of homebuilding activity partly to the Sept. 1 easing of credit limitations and partly to builders' efforts to get construction under way before further materials controls are imposed. Loosening in supply of money for the residential mortgage market might have helped too.

Industrial construction is currently on a weekly roller coaster. Awards fell from a seven-month high in late September ($219 million) to $54 million; then they rose to $95 million in the week ended Oct. 18. Total heavy construction awards for the week amounted to $195 million.

Employment At Peak...

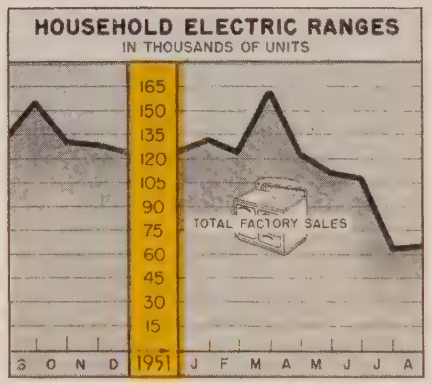
September employment in nonfarm establishments set an all-time peak of 46.9 million despite a less-than-seasonal gain over the month, says the Labor Department. Nearly 1.2 million more people were working in mid-September than a year earlier. Unemployment at that time was



Gas Ranges
Shipments in Units

	1951	1950	1949
Jan.	260,600	165,000	106,700
Feb.	254,000	209,000	117,700
Mar.	289,800	264,000	151,500
Apr.	225,000	239,100	150,100
May	177,800	242,800	151,600
June	128,500	217,000	162,200
July	116,400	254,800	125,800
Aug.	151,500	331,500	206,100
Sept.	182,800	287,000	227,300
Oct.	.....	308,000	257,500
Nov.	.....	269,100	237,400
Dec.	.....	235,900	175,700
Total	.....	3,023,200	2,069,600

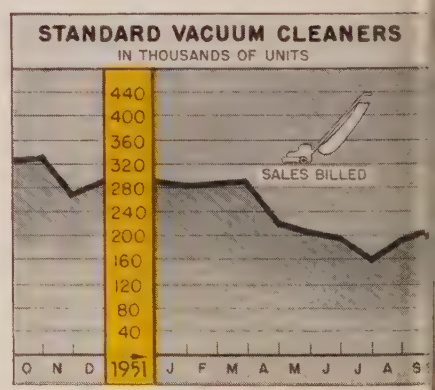
Gas Appliance Mfrs. Assoc.



Household Electric Ranges
Total Factory Sales—Units

	1951	1950	1949
Jan.	132,437	97,925	109,919
Feb.	123,953	118,989	88,333
Mar.	162,267	145,417	88,934
Apr.	122,803	132,859	60,739
May	109,572	145,498	52,881
June	107,861	158,534	69,107
July	62,713	130,505	63,249
Aug.	64,874	132,243	66,753
Sept.	.....	156,216	93,045
Oct.	.....	130,452	73,312
Nov.	.....	129,384	60,523
Dec.	.....	124,360	77,011
Total	.....	1,602,382	903,806

National Electrical Mfrs. Assoc.



Standard Vacuum Cleaners
Sales Billed—Units

	1951	1950	1949
Jan.	282,305	249,150	228,769
Feb.	261,572	263,515	241,267
Mar.	290,242	361,014	309,897
Apr.	227,216	292,664	252,656
May	201,983	278,645	222,850
June	194,548	250,190	207,354
July	161,002	279,967	161,920
Aug.	191,299	341,232	219,909
Sept.	210,086	327,524	250,036
Oct.	.....	331,445	272,520
Nov.	.....	265,310	253,516
Dec.	.....	288,756	265,513
Total	.....	3,529,412	2,886,514

Vacuum Cleaner Mfrs. Assn.

Charts—Copyright 1951, STEEL

about 300,000 below the previous postwar low for the month, according to Census Bureau figures. Only 180,000 more people were working in September than in August; average gain in the past five years has been nearly a half-million. The Labor Department attributes this poor showing to reduced employment in many consumer goods industries. Strangely, auto plant employment increased in the month, the first gain since last March. Manufacturers of durable goods employed almost 9 million in September, a half-million more than a year before. Contract construction employment, at 2.7 million, was still at an all-time high for the season because of industrial and military building.

Awakening in Appliances...

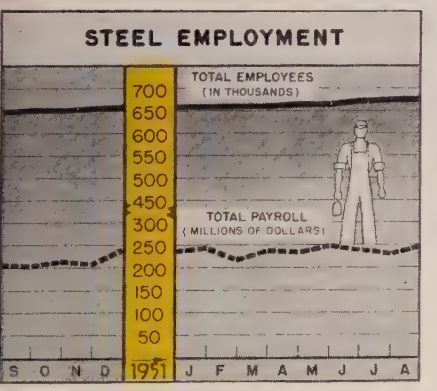
Return to a seller's market in nearly all types of appliances has been forecast from many quarters. Lowered inventories have prompted manufacturers to revise production schedules upward for fall-winter. Electric and gas ranges and vacuum cleaners are typical (see charts). Electric refrigerator makers also report higher fall output. Washer and ironer sales were up in September too. Household washer factory sales increased 31.2 per cent in September to 313,746 units, but were still 26 per cent below September, 1950. Ironer sales rose 6.4 per cent to 18,300 units, 56 per cent under year-ago levels.

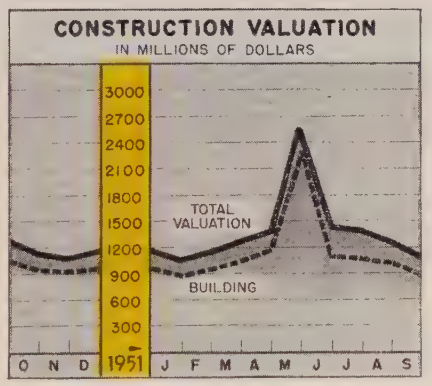
Trends Fore and Aft...

About one-fifth of all factory workers are women. Real tightening in the labor market will be seen when that ratio hits one out of three, the World War II figure. . .Manufacturers set aside twice as much money for income taxes in the second quarter as they did the year before. Despite a healthy sales increase, profits in that period continued the downward trend begun at the end of 1950. . .Orders for more new locomotives were placed in September than in any other month on record. . .Intercity tonnage transported by motor carriers has risen for seven successive years.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Durable Goods Oct.8	Gear Sales Oct.15	Radio, TV Oct.15
Employ., Metalwk...Oct.8	Indus. Production...Oct.1	Refrigerators Oct.1
Fab. Struc. Steel....Oct.15	Ironers Sept.17	Steel Castings Oct.22
Foundry Equip. Oct.15	Machine Tools Oct.8	Steel Forgings Aug.20
Freight Cars Oct.23	Malleable Castings ..Oct.22	Steel Shipments ...Aug.27
Furnaces, Indus. ...Oct.15	Prices Oct.1	Wages, Metalwkg....Oct.22
Furnaces, W. Air ..Sept.17	Pumps, New Orders.July9	Washers Sept.17
Gray Iron Castings..Oct.22	Purchasing Power...Oct.8	Water Heaters Oct.1





Steel Employment, Payrolls

	Employees† in Thousands		Payrolls in Millions	
	1951	1950	1951	1950
Jan.	657	609	$245.3	$189.3
Feb.	663	613	219.4	174.7
Mar.	663	616	238.3	190.0
Apr.	666	621	234.8	186.2
May	667	628	249.0	199.9
June	674	636	240.7	195.3
July	678	643	231.9	188.7
Aug.	679	649	246.7	206.6
Sept.	...	650	....	203.8
Oct.	...	650	....	212.2
Nov.	...	653	....	208.0
Dec.	...	657	....	235.0

† Monthly average. American Iron & Steel Institute.

Construction Valuation

(37 States)—In Millions of Dollars

	Total		Building	
	1951	1950	1951	1950
Jan.	1,043.2	730.9	881.9	578.8
Feb.	1,140.5	779.5	962.3	627.0
Mar.	1,267.4	1,300.2	1,043.8	1,075.3
Apr.	1,375.0	1,350.5	1,108.9	1,123.5
May	2,573.0	1,347.6	2,295.0	1,083.0
June	1,408.9	1,345.5	1,098.4	1,072.0
July	1,379.8	1,420.0	1,084.7	1,162.2
Aug.	1,262.8	1,548.9	1,043.5	1,295.1
Sept.	1,082.9	1,286.5	884.2	1,048.3
Oct.	.....	1,135.8	.....	956.7
Nov.	.....	1,087.1	.....	931.6
Dec.	.....	1,169.4	.....	969.0
Total	.....	14,501.1	.....	11,922.5

F. W. Dodge Corp.

Help Lower Unit Production Cost to Meet Competition *Profitably . . .*

Simplified screw driving, bolt setting and nut running mean lower unit cost. This is possible with Pheoll products because they are inspected through all manufacturing steps from coil wire or bar stock to the finished product.

All threads, whether rolled or cut, are carefully gauged to American Standards. Screw and bolt heads are formed, slotted or recessed to meet rigid engineering requirements. Overall quality of the finished product is uniformly high. Precision head formation on all bolts as well as engineered slots and recesses in all screws means less wrench and driver-slippage.

Pheoll engineers will recommend the correct type, size and finish of standard or special screws, bolts and nuts for your needs.

WHAT PHEOLL INDUSTRIAL FASTENERS MEAN TO YOU

- Simpler and speedier assemblies.
- Less worker fatigue — more units.
- Improved product appearance.
- Added latitude in product design.
- Immediate and dependable source for standardized, interchangeable screws, bolts and nuts especially suited to mass production.

CHECK THESE PHEOLL PRODUCTS FOR YOUR NEEDS

- ☐ Machine Screws
- ☐ Sems
- ☐ Tapping Screws
- ☐ Square Head Set Screws
- ☐ Threaded Cutting Screws
- ☐ Cap Screws
- ☐ Phillips Recessed Head Screws
- ☐ Machine Bolts
- ☐ Wing Nuts
- ☐ Knurled Nuts

Write for literature

Pheoll MANUFACTURING COMPANY
5700 ROOSEVELT ROAD
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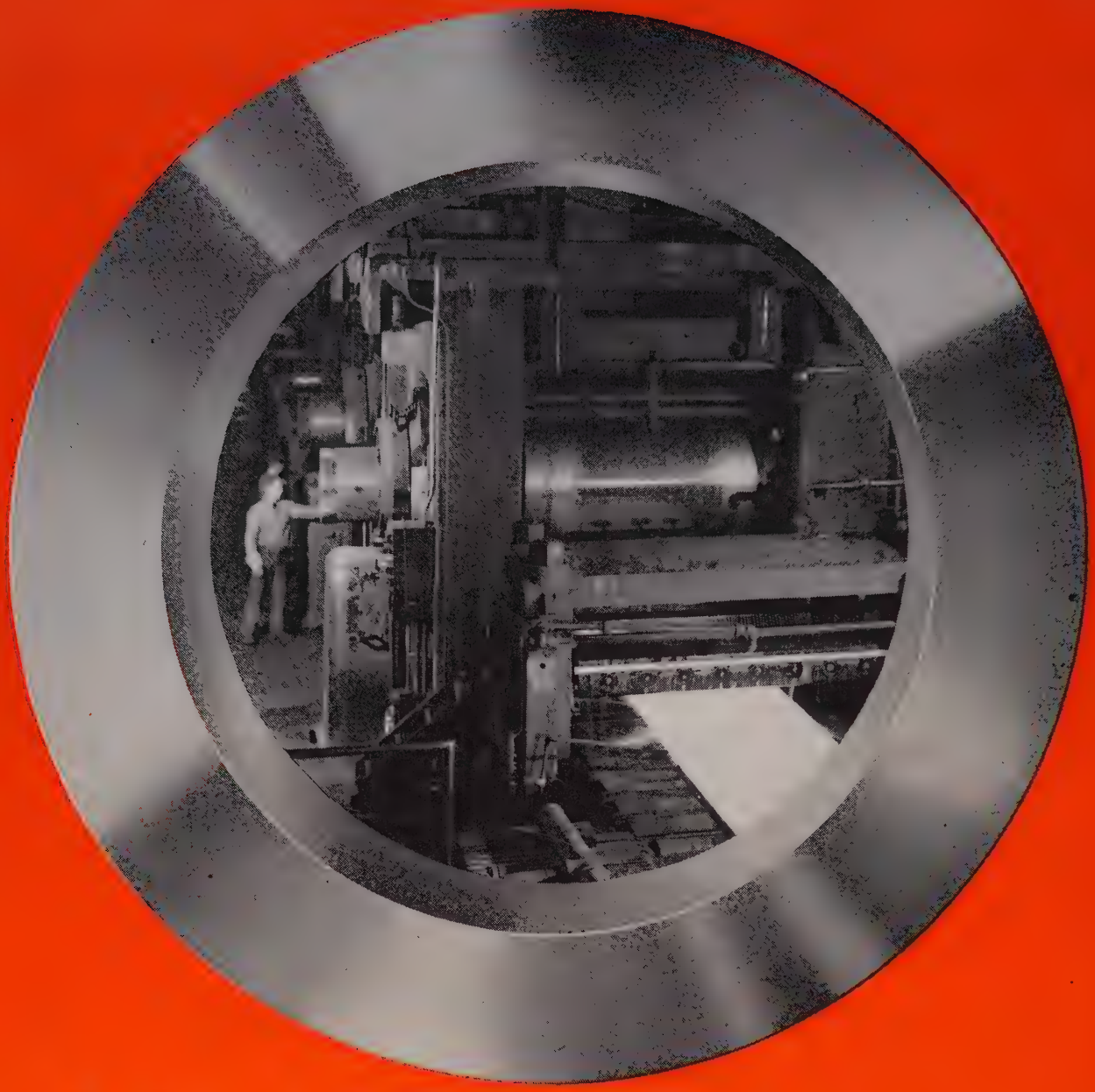
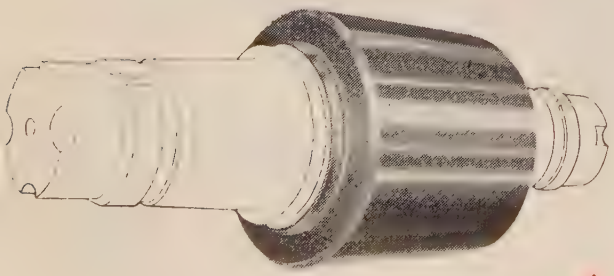
Industrial Fasteners and Holding Devices



Custom-built to roll more tons . . .

Heppenstall Sleeves



Don't scrap worn rolls—re-sleeve them!

Heppenstall back-up roll sleeves roll record tonnages . . . last longer in high speed service because their design permits more effective forging and heat treating operations.

Made from Heppenstall's own steels, each sleeve is mandrel forged—worked thoroughly to produce maximum density and grain refinement. With careful heat treating, the working surface of every sleeve is tempered to meet exact hardness specifications. Heppenstall also makes forged arbors . . . has facilities to grind arbors and sleeves for perfect shrink fitting. Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

Heppenstall

—the most dependable name in forgings

Men of Industry

A. S. JOHNSON
. . . president of National Carbon

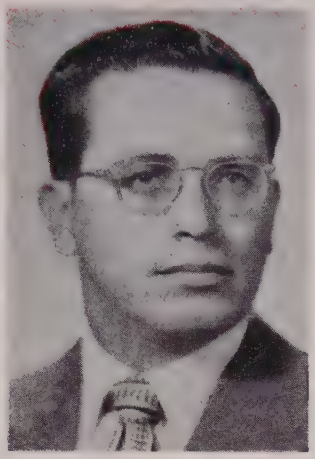
A. S. Johnson was appointed president of **National Carbon Co.,** a division of Union Carbide & Carbon Corp., New York. Mr. Johnson has been vice president and general manager since 1950. During the 1930s he served at National Carbon's plant in Shanghai, China. He returned to the United States in 1939 and in 1948 became vice president in charge of foreign plants.

Pittsburgh Screw & Bolt Corp., Pittsburgh, appointed **E. Mark Nease** assistant purchasing agent. He previously was with Treadwell Construction Co. as purchasing agent.

J. L. Pettit was elected vice president and general manager, **Metalwash Machinery Corp.,** Elizabeth, N. J. He is succeeded as sales manager by **Webb L. Nimick,** formerly Detroit sales representative. **W. W. Clark** has retired as president, and **E. R. Zademack,** founder of the company, is now chairman of the board.

J. B. Waskey was appointed assistant to the vice president of production at **Pacific Airmotive Corp.,** Burbank, Calif. He was manager, engine division. **L. B. Littrell,** formerly manager, aircraft division, was named to succeed Mr. Waskey, and has additional duties as jet project engineer.

Harry Jones was named divisional superintendent of the tube mills in the Youngstown district for **Republic Steel Corp. James McClintock** succeeds Mr. Jones as superintendent, continuous weld tube mills at Youngstown, and **Edward Weden Jr.** was named assistant superintendent to succeed Mr. McClintock.



J. W. SPOOR
. . . A. O. Smith division sales mgr.

J. W. Spoor was named general sales manager, welding products division, **A. O. Smith Corp.,** Milwaukee. **L. F. Vonier,** former sales manager, assumes the newly created position of sales promotion manager, where he assists division manager **L. T. Hickey** and Mr. Spoor in expanding the company's sales of both welding electrodes and welding machines.

Harry H. Fair was elected chairman of the board of **Caterpillar Tractor Co.,** Peoria, Ill. He succeeds the late **C. L. Best.** Elected to the board to replace Mr. Best is **A. H. Brawner,** president of W. P. Fuller & Co., San Francisco.

Chester A. Henry was appointed assistant manager of the magnesium foundry at **Ford Motor Co.'s** Aircraft Engine Division, S. Cicero, Ill. Prior to joining Ford, Mr. Henry was owner of Interstate Precision Pattern & Engineering Co.

Crawford Gordon Jr. resigned as Canada's arms production chief to become president and general manager of **Avro Canada Ltd.,** Toronto, aircraft manufacturer. He formerly was executive vice president of John Inglis Co.

D. H. Bradley, former assistant to vice president-operations, **Ingalls Iron Works Co.,** was appointed production manager of the company's Verona, Pa., plant.

Paul Harter was named chief project engineer, industrial division, **Warner Electric Brake & Clutch Co.,** Beloit, Wis. He joined Warner in 1947 and previously was senior test engineer at Wright Aeronautical Corp.

WILLIAM M. WILLIAMS
. . . purchasing agent for Hudson Motor Car

William M. Williams was appointed purchasing agent for **Hudson Motor Car Co.,** Detroit. He was assistant to the vice president of Cleveland Graphite Bronze Co.

W. R. Leopard was appointed to direct operations of the public works division of **Worthington Pump & Machinery Corp.,** Harrison, N. J. **D. L. Gallagher** was made manager of the division. Plant executives appointed to new posts include: **George P. Passmore,** named assistant to the vice president in charge of manufacturing at Harrison; **A. M. Tullo,** appointed works manager, Wellsville, N. Y., plant; **John Burlick,** appointed assistant to the works manager at the Harrison plant, in charge of industrial engineering activities, and **Max A. Heyman,** assistant to the works manager, Harrison plant, in charge of production control activities.

E. G. Shower, formerly a member of the technical staff of Bell Telephone Laboratories, joined **Radio Receptor Co. Inc.,** Brooklyn, N. Y., as chief engineer of its newly formed germanium division.

A. J. Shradel was appointed manager, Seattle district sales office, **Cutler-Hammer Inc.** He succeeds **T. N. Bristow,** retired. Mr. Shradel also manages the Portland, Oreg., office in sale of Cutler-Hammer motor control and allied electrical apparatus.

Consolidated Vultee Aircraft Corp., San Diego, Calif., appointed **R. C. Loomis** manager of B-36 improvement changes, **G. A. Covington** manager of quality control, and **P. M. Prophett** manager of flight. **R. S. Watt** was

named superintendent of tool manufacturing.

William N. Noble was appointed assistant to the president, **Ferro Corp.,**

WILLIAM N. NOBLE
. . . asst. to president, Ferro Corp.

Cleveland. He joined Ferro in 1933. He served in research and development capacities until 1947 when he was made manager of the frit division. **J. H. Ginther** becomes assistant to the executive vice president to direct manufacturing operations of the corporation.

J. H. Roach was named assistant sales manager of the Houston office of **Babcock & Wilcox Tube Co. W. C. Mohrman** was appointed a district salesman in the Tulsa, Okla., office.

Link-Belt Co. appointed **Bert L. Pearce** chief engineer of the Ewart plant, Indianapolis, to succeed **Charles R. Weiss,** retired after 42 years' service at the Philadelphia and Indianapolis plants. **Russell T. Sweeny** was appointed assistant chief engineer.

Appointments at the X-Ray department, **General Electric Co.,** Milwaukee, include: **Oscar L. Dunn,** appointed assistant to **H. V. Erben,** executive vice president of General Electric Co., New York. **William C. Gaygan** succeeds Mr. Dunn in the X-ray department as manager-finance. **Edward W. Philleo** becomes marketing manager to succeed **Willard J. Cox,** and is succeeded by **W. G. S. Southam** as general manager, General Electric Medical Products Co. **E. W. Hollingum,** manager, Canadian government section for GE X-Ray, assumes Mr. Southam's duties as manager, Montreal office.

Henry P. Graef was appointed commercial research manager, general sales department, **United States Steel Supply Co.,** Chicago, subsidiary of U. S. Steel. In 1947 he was named commercial research analyst in the general offices, and since April has been assistant manager, commercial research division.

J. D. Moran was appointed director of material controls, **Chrysler Corp.,** Detroit. **W. J. Jones** was named supervisor of the central routing department, and **E. B. Daniels,** assistant supervisor of that department.

W. Burl Saul was named vice president in charge of production and engineering of **L & J Press Corp.,** Elkhart, Ind. He has been associated with the press industry for 24 years. He formerly was a partner in Power Press & Equipment Co., Toledo, O., and prior to that was with E. W. Bliss Co.

T. A. Bedford was appointed vice president in charge of manufacturing

T. A. BEDFORD
. . . K-F V. P.-manufacturing

of **Kaiser-Frazer Corp.,** Willow Run, Mich. He joined K-F in 1946 at the Detroit Engine Division. He has been general manager of the engine plant since 1947.

N. H. Arnold was appointed sales manager, **Standard Railway Equipment Mfg. Co.,** Chicago. He will be in charge of development, manufacture and sales of Standard's wheel-truing machine.

George Stern and **Richard P. Seelig** were elected vice presidents of **American Electro Metal Corp.,** Yonkers, N. Y. The two new executives are holders of many patents and are authors of various publications on powder metallurgy.

A. Milne & Co., New York, appointed **Edward J. Silk** as Connecticut sales representative with headquarters in New Britain, Conn., and **Courtland W. Schefer** as manager, Philadelphia office and warehouse.

William J. Delahanty was named vice president in charge of manufacturing, **Burroughs Adding Machine Co.,** Detroit. He joined the company in 1912 and since 1950 has been general manager of manufacturing.

Charles E. Reardon resigned as sales manager of Johnson Steel & Wire Co. Inc., Worcester, Mass., to become vice president of **Wire Corp.,** that city.

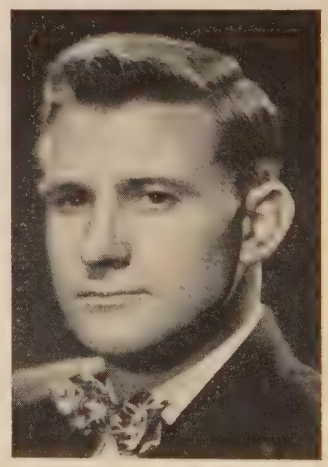
L. O. Griffith was elected vice president in charge of manufacturing, **Pittsburgh Corning Corp.,** Pittsburgh. He has been with the company since 1937.

Stanley Dero was promoted to general foreman of Lukenweld machine shop, **Lukens Steel Co.,** Coatesville, Pa.

Henry Castle, former Chrysler Corp. plant layout engineer, has joined Don W. Kelsey in establishment of **Don W. Kelsey Co.,** Detroit. Mr. Kelsey represented Union Steel Products Co. and the new company will serve as distributor of Union's materials handling equipment.

Graybar Electric Co. Inc., New York, appointed **Howard Sommer** operating manager, Memphis, Tenn., branch, and **Charles G. Campbell,** operating manager, Reading, Pa., branch.

J. F. Helsel was appointed manager of **Wel-Met Co.'s** plant No. 2 at Salem, Ind. He has been with Wel-Met since 1946 and prior to this appointment



J. F. HELSEL
. . . will manage Wel-Met's Salem plant

served as assistant works manager of plant No. 1 at Kent, O. The Salem plant will be in operation Jan. 1 and will be devoted to production of metal powder parts for aircraft, tanks,

If your plant uses machine tools with tableways

YOU CAN'T AFFORD NOT TO READ THESE STATEMENTS

188 metalworking concerns which buy all their other lubricants from our competitors insist on the use of Sunoco Way Lubricant. *They* tell *us* no other refiner has a comparable product.

38 leading machine tool manufacturers approve or specifically recommend the use of Sunoco Way Lubricant on the tableways and slides of their metalworking equipment.

5 different metalworking problems have frequently disappeared as if by magic when Sunoco Way Lubricant was applied. Most such problems, while attributed to other causes, were proved to be the result of the use of inadequate tableway lubricants. Sunoco Way Lubricant has eliminated trouble supposedly caused by *poor machine tool design* and *deficiencies in hydraulic drives*. Sunoco Way Lubricant also has cleared up *inability to hold close tolerances* and has put an end to *poor finishes* and *scoring of ways*.

Want to see factual case histories and learn more about this product? Send for illustrated booklet, "Sunoco Way Lubricant." Samples are available, too, to companies in the metalworking industry. Write Dept. S-10.

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SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

R. B. REID
. . . GE advertising-sales promotion

FRANK A. VOTTA JR.
. . . Hunter Spring chief engineer

JOHN S. MADDEN
. . . G. A. Gray Co. sales manager

trucks and other materiel for the armament program.

R. B. Reid was appointed assistant manager, advertising-sales promotion department, apparatus marketing division, **General Electric Co.,** Schenectady, N. Y.

Paul F. Kohlhaas was appointed assistant vice president-design and appropriation control, **United States Steel Co.,** Pittsburgh. In this newly created position Mr. Kohlhaas will be responsible for equipment and plant designs and layouts, estimates of construction costs, and engineering control of expenditures.

Charles R. Lund was appointed sales engineer in the Los Angeles district office of **Tinnerman Products Inc.** He has been a salesman with Air Associates Inc. since January, 1950.

Frank A. Votta Jr. was appointed chief engineer of **Hunter Spring Co.,** Lansdale, Pa. Associated with the company since 1941, Mr. Votta has been engineer in charge of design in Hunter's Neg'ator Division for the past two and one-half years. He will head engineering, design and research activities in all phases of company operation except the Neg'ator Division.

C. Fred Gibbs was made assistant manager, industrial relations division, **York Corp.,** York, Pa.

Donald A. King joined **Pennsylvania Salt Mfg. Co.'s** sales-service organization in the industrial chemicals department, Detroit.

George Hamill Jr. was appointed sales manager, **Magna - Crest Corp.,** New York.

John S. Madden was appointed sales manager of **G. A. Gray Co.,** Cincinnati, manufacturer of planing, milling and boring machines.

Richard C. Cessna joined **Fort Pitt Malleable Iron Division** of Steel Trading Corp., Pittsburgh, as assistant works manager.

Charles H. Besly & Co., Chicago, appointed **J. W. Oliver** district manager of eastern Michigan, Indiana, western Ohio and Kentucky.

Donald C. Burdette was appointed manager, parts and accessories sales department, **Ford Division,** Ford Motor Co., Dearborn, Mich.

R. A. Joslyn, formerly purchase director of Reynolds Wire Co., Dixon, Ill., is now director of purchases of **Coolerator Co.,** Duluth.

OBITUARIES...

Howard W. Pound, 55, vice president and manager of the air filter sales division, **American Air Filter Co. Inc.,** Louisville, died Oct. 10.

Richard A. Baines, 83, founder and president, **Baines & David Ltd.,** Toronto, died Oct. 15. He founded the steel firm nearly 50 years ago.

William H. Remmel, 79, retired Pittsburgh industrialist, died Oct. 19. He at one time was connected with American Window Glass Co. and later the Verona Tool Works before taking charge of the tool division, **Hubbard & Co.** in 1915. He became vice president and director of the Hubbard company in 1929 and retired in 1945.

Charles K. Nichols, 86, one of the organizers of **West Penn Steel Co.,** Brackenridge, Pa., predecessor of the present Allegheny Ludlum Steel Corp., died Oct. 20. He was manager and vice president.

Walter E. Mackley, 58, New York district sales manager, **American Steel & Wire Co.,** died recently. He joined the company in 1912.

William F. Angus, 77, president of **Dominion Bridge Co.,** died Oct. 14 near Montreal. He also was president of Dominion Engineering Works Ltd., and vice president of Canadian Car & Foundry Ltd.

Alfred W. Fox, 47, manager of energies and electrical engineering at **Ansco,** a division of General Aniline & Film Corp., New York, died Oct. 16.

Frederick Bezner, 73, pioneer in the automobile industry and co-founder of **Hudson Motor Car Co.,** Detroit, died at his home in Darien, Conn., Oct. 17. Until eight years ago he was an official of Red Wing Aircraft Corp., Croydon, England, which he founded.

E. A. Weidler, 62, a mechanical engineer for **A. O. Smith Corp.,** Milwaukee, died Oct. 14.

George McKechnie, 51, tool room supervisor, **Ternstedt Division,** General Motors Corp., Detroit, died Oct. 10.

Albert I. Appleton, 79, founder of **Appleton Electric Co.,** Chicago, died Oct. 18. He retired in 1946 as president and treasurer.

John B. Livingston, 65, Cleveland district sales manager, **Eagle-Picher Lead Co.,** died Oct. 17.

J. F. Etter, chairman of the board, **Hardwicke-Etter Co.,** Sherman, Tex., died Oct. 16.

Production and Engineering

NEWS AT A GLANCE

MACHINE SPEEDS UP, COSTS DOWN— Two new 75-hp carbide-tooled automatic lathes have replaced four older machines in an automobile plant for turning transmission step gear blanks from cycle-annealed alloy steel forgings. The two new units, equipped with ten tools each, produce 190 pieces per hour against 168 for the four older lathes. The annealing operation gives the optimum microstructure for fast machining.

PRECISION-STAMPED STAINLESS— Mass-fabrication of stainless steel parts for jet engines is under way at one aircraft plant equipped with a fully-mechanized production line which can stamp sheet metal components to machine shop tolerances. The first of eight such lines forms and welds inner and outer combustion chambers for J47 engines. Completion of the current plant expansion program will enable the company to increase production approximately five times the present output. —p. 64

"BAMBOO" STEEL TUBING—By fitting thin-wall steel tubes with internal diaphragms at appropriate intervals, a European inventor proposes to develop a structure he calls "steel-bamboo" tubing, embodying greatly increased buckling strength with a considerable saving in material. The process is stated to require no special machinery and to be adaptable to mass production. Tubing of the "bamboo" type has been used successfully for lamp standards on the street of a Continental town. Other suggestions: Poles for overhead wires for use on electric railway and bus systems, towers for high-tension power lines.

PLUG THE DRAIN—By applying plain common sense good-housekeeping principles, plating departments can salvage untold quantities of valuable materials and at the same time curb stream pollution. Steps to be taken include draining the work properly, minimizing drag-in of water from rinse tanks preceding processing tanks, rinsing effectively by using racks and fixtures free from metal buildup or corrosion, preventing leaks, salvaging solutions, selling or exchanging baths. —p. 66

SPRAY FROM CENTRIFUGE—Novel type of all-electric airless spray gun called the Egaspray makes use of the edges of high-speed centrifuges for atomizing and throwing the liquid coating, motive power being supplied by a universal electric motor placed in the gun housing above a pistol grip of conventional design. In operation the motor drives through a small gearbox a feed pump of the Archimedian screw type which rotates in the liquid container attached to the forward part of the gun. Since only the principles of liquid being sprayed have energy there is said to be less mist or bounce from the surface, making it possible to work within 1 inch of the object sprayed.

POLISH IN A LATHER—Soap suds produced by the familiar barber shop lather dispenser is the only satisfactory polish for soft crystals of the kind which transmit invisible light and heat rays, reports the Office of Naval Research. The lather not only floats away metal powders used in grinding and polishing the crystals, but adds a polishing effect of its own. The barber shop dispenser seems to be essential to the process since liquid soap or soap suds whipped up in a mug were not successful. The lather used contains a garnet powder for the initial grinding steps and an aluminum oxide powder for the final polishing.

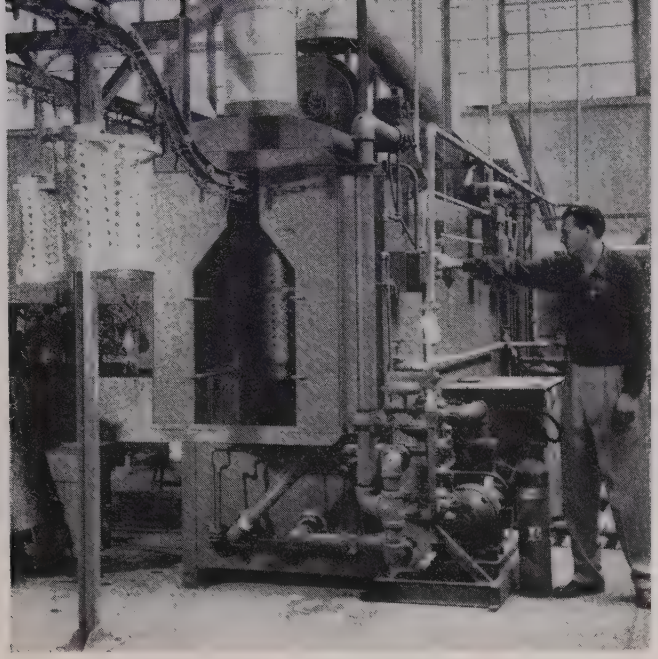
COST VARIANCE ANALYZED — An effective tool used by accountants to help management improve steel mill operating performance is analysis of cost variances. Records and practices of a mill are literally "taken apart" and studied to determine the validity and application of standards. In many cases variances are traced back for a period of years to see if standards have ever been attained. —p. 78

INCONEL FOIL HOLDS WRAP—Experimenting with insulating blankets for jet burner tubes, a fabricator tried precious metal foils to wrap fiber glass and wool around the tubes. They worked fine, even under prolonged exposure and heat, but the cost was rough. Inconel foil, thinner than a hair and weldable by resistance methods, proved strong enough at yellow heats and tough enough to take handling abuse without tearing.

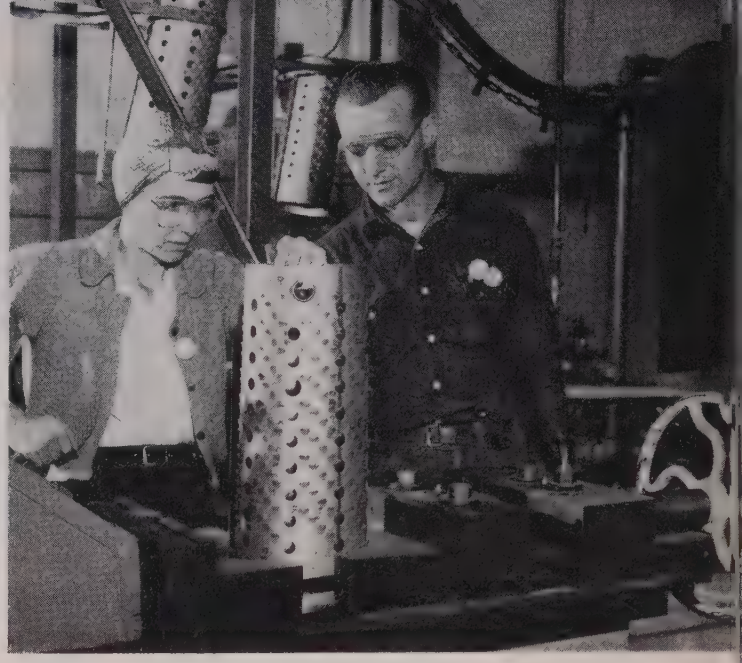
MORE MACHINE TOOLS—Five thousand machine tools now in Air Force custody will be made available to Army and Navy contractors, beginning Oct. 29. Tools selected by contractors (from storage at Marietta, Ga., and Omaha, Nebr.) will be transferred to custody of the army or navy, who will then lease them to contractors. The tools are valued at $80 million.

MISSILE NICKEL— Liquid oxygen tanks used on some guided missiles create a complex problem of strength-temperature relationships. The pressure is high while the temperature is at an embrittling low of 200 °C below zero. After some tests, the manufacturer specified K Monel whose ductility and toughness are unaffected at liquid oxygen temperatures and whose tensile strength actually increases at this biting low.

Metalworking Outlook—p. 27 *Market Outlook—p. 103*



Immediately after press operation to produce the necessary perforations, the J47 inner combustion chambers pass through this automatic washer where they are cleaned for subsequent welding



End-sizing a combustion chamber. End is first swaged undersize, then expanded to size. Tolerance is 0.010-inch

By GILBERT C. CLOSE

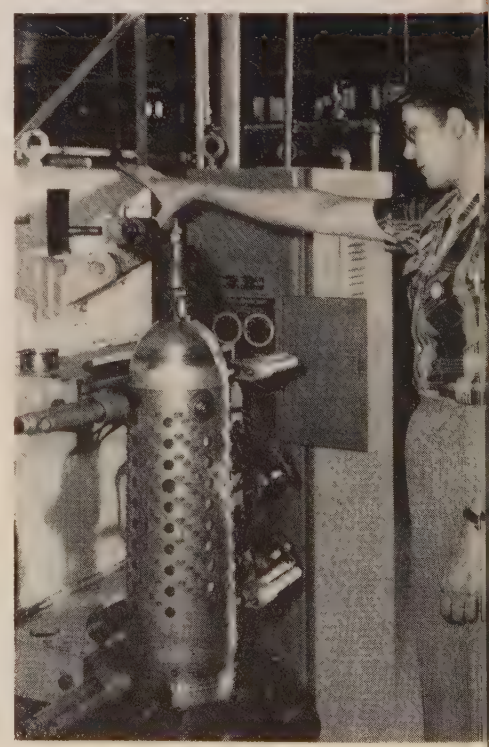
Stainless Jet Engine Stampings Mass-Fabricated on Production Line

Formed and welded on conveyor lines, sheet metal parts such as inner and outer combustion chambers are built to machine shop tolerances. Mechanization boosts production

WHAT will eventually be one of the nation's largest fully mechanized production lines for precision stainless steel parts is gradually emerging from the turmoil of plant expansion at Solar Aircraft Co., San Diego, Calif. For several years Solar has been a large consumer of stainless steel used in the manufacture of aircraft engine manifold and exhaust systems. This status will solidify as the program for producing many components for the General Electric J47 jet engine swings into full action.

Eight Lines Planned—When the current plant expansion program is completed, eight distinct mechanized production lines for stainless steel will be in operation—four main lines and four feeders. About 85 people per shift will be employed in the department, supplemented by trained standby reserves to fill in when and where needed. Cost of the installation will be over $500,000. Company officials estimate that the new facilities and the manner in which they operate will increase production approximately five times the present output.

While the Solar installation will exhibit no marked deviations from general mechanized production line principles, the big problem involved is one of main-



Solar - designed automatic post welder used to spot-tack weld caps and exit ends on combustion chamber

taining precision. The main products produced will be inner and outer combustion chambers and transition liners for jet engines. These are all sheet metal products, yet must be held within tolerances more compatible with precision machine shop work.

Plant Conveyorized—Heart of the new system will be the power conveyor lines used to transport parts past the various work stations. These lines will move at various speeds; preliminary time studies indicate that the slowest line will move approximately 8 feet in 5 minutes, with the fastest moving about 2½ feet per minute. Parts will leave the line in cartons ready for shipment.

Included in the department will be 12 mechanical and hydraulic presses ranging upward to 200 tons in capacity and used for rolling the chambers and liners, piercing holes, forming louvers, etc. Thirty resistance (spot and seam) welding machines will be used in fabrication.

Conveyors will carry the parts through automatic washers at intervals where cleaning is necessary. Special high production steel dies, jigs, fixtures and carrying devices have been or are being tooled to fit in wherever needed, or where they will speed the production rate.

Cycle Speeded—Of the mechanized production lines already in operation, the one producing inner combustion chambers is representative of the rest. The chambers arrive on this line in the form of rolled, seam-welded tubes of proper length for the inner combustion chamber component. First line operations are through a series of presses where holes are pierced. Louvers are formed by partial piercing and holes for installation of the fuel injection nozzles are punched. These latter must be held within a tolerance of 0.020-inch on centers. Forming of the louvers must be held within 0.002-inch, a difficult tolerance to obtain with sheet metal in a press operation. Current production cycle at this stage and throughout the line is one part every 6 minutes. This cycle will be speeded up considerably as more facilities are completed and made available.

After the press work, the chambers are hand-annealed to permit forming of the cross-over eyelets. Replaced on the conveyor, the chambers then procede through an automatic washer where a hot Turco solution cleans them thoroughly. Immediately after washing, each chamber is given its initial line inspection. The main cause of rejection at this point is cracked eyelets resulting from press action; however such rejections are very few.

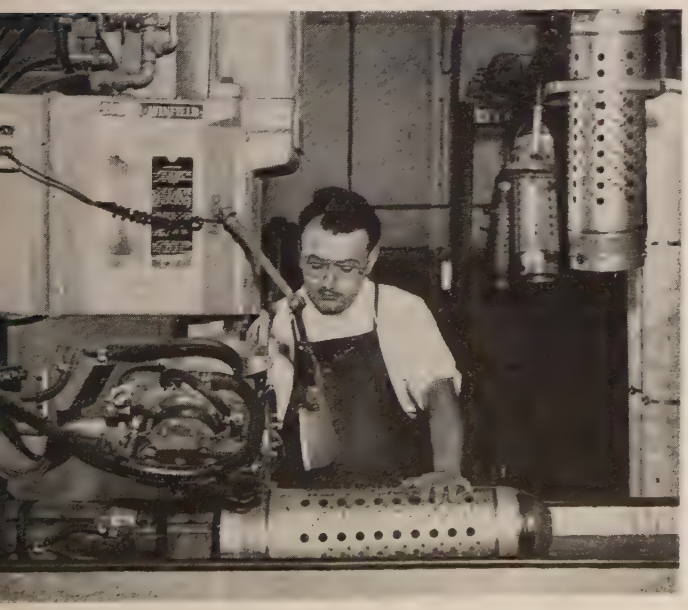
Double Operation—Following inspection, the inner chambers proceed to the end-sizing machine. This is a double operation, and must result in an end size with a tolerance within 0.010-inch. To accomplish this, each end of the chamber is first swaged undersize, then placed over an expandable mandrel and expanded to the required size.

Next the ends are placed on the chamber and tack-spotwelded in place on an automatic post welder jigged to required dimensions. Two large Taylor-Winfield roll seam resistance welders then complete attachment of the cap and exit ends.

After welding, the chambers are burred, then washed with mineral spirits. Another spot welding operation attaches the flange for the air scoop, then the chambers are ready for final inspection. Both visual and jig inspection are used, the latter to check final critical dimensions. Rejections to date have run under those experienced when the combustion chambers were fabricated under old, nonmechanized conditions.

Bruce Willsey, superintendent of the department, points out that mechanization has vastly increased production. Less handling of parts is the largest contributing factor. Before installation of the power conveyors, parts had to be handled from work station to work station by truck.

Roll welding the tack-welded caps and exits on a combustion chamber



After final inspection, left, combustion chambers are placed in cartons, lower right, for shipment

The easiest, cheapest and most efficient waste-control procedure is to minimize the amount of waste produced. This can be accomplished by good housekeeping. Treatment of waste is expensive. Control of waste is profitable

Plating Room Controls

. . . Cut Operating Costs, Curb Stream Pollution

FOR years, many metal-finishing departments have operated uneconomically, heedlessly disregarding the wasteful use of supplies. Unbelievable quantities of metal salts, acids, and cleansers are rinsed off or permitted to drip directly into the sewer. Batches of partly contaminated and weak solutions are dumped without an effort at salvage.

Large losses also occur through breaks in lines, vats or storage units. These practices, if not curtailed, add to the size and cost of required waste-treatment facilities. Treatment-plant operation costs also are increased.

A plant can profit by salvaging materials through application of just plain common sense. Here are some simple good housekeeping principles:

Drain Work—The work—the material being plated—removed from any processing bath should be allowed to drain thoroughly directly back into the bath unless such practice interferes with the quality of processing. In manual or hoist-operated equipment, if timing of the operation permits, work coming from the tank may simply be allowed to drain over the tank a few seconds instead of being immediately moved forward to the next tank. An automatically timed, hoist-raising device can be designed to provide an adequate period for drainage. Such timing devices are much cheaper to use than are waste-treatment facilities.

On hand-operated tanks the simple expedient of a bar or rod located over the processing tank, but otherwise out of the way, serves as an excellent temporary resting place for the small racks while the metal is draining.

One case history showed that use of a drainage bar on a hand operated chromium tank for plating hub caps resulted in a reduction of chromic-acid consumed from 16 to 3 pounds per 1000 hub caps processed. This meant a saving of $3.64 per 1000 caps with no increase in labor. The chromic acid saved did not have to be removed from the plant effluent and was available for further plating.

Save-Rinse Tanks—In moving forward from a processing bath, any solution necessarily remaining on the work should be rinsed in a still-water or save-rinse tank. This rinse water should be returned to the processing tank.

One save-rinse tank may reduce chemical supplies used by about 60 per cent. Two rinses will result in nearly 80 per cent savings of the supplies. Chemicals salvaged for reuse do not need to be removed from waste water.

Extent to which concentration of metal salts build up in the save-rinse solutions should determine the number of rinses to be employed. Another important consideration in determining number of rinses is design of parts being processed.

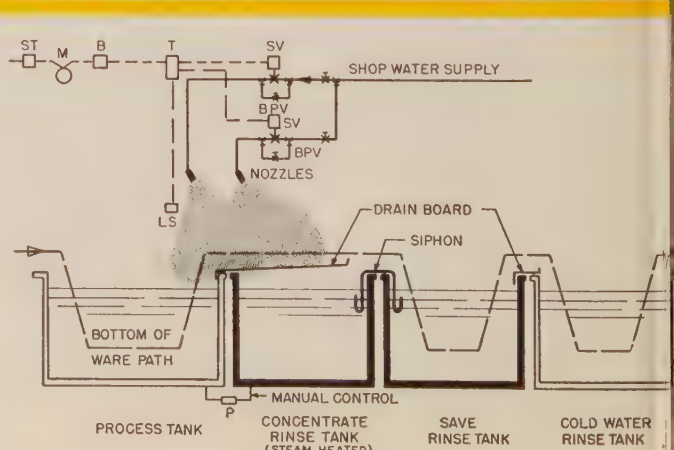
Save-rinse facilities should be designed so that the concentration in the last rinse tank does not exceed 5 per cent of that of the processing bath. It is true that operation of a number of rinses may incur added labor cost in the metal-finishing department. But additional labor is also required to run a waste-treatment plant.

Save-Rinse vs Fresh Water — Plating facilities should be designed to permit easy return of save-rinse solution to the processing bath by pumps, air lifts, or siphons. Steps should be taken to make it difficult or impossible for an operator to add fresh water to a processing bath.

Rate of evaporation of processing baths is frequently so small that effective use of save-rinse solutions is difficult. In such case provision should be made for concentrating save-rinse solutions by heating. Impurities that interfere with this method of solution recovery can be minimized by employing properly lined tanks. Impurities might be removed by deionization.

Minimize Drag-in—Minimize drag-in of water from the rinse tanks preceding the processing tank by draining the work as completely as possible. Otherwise more water has to be evaporated from the processing or save-rinse tank before the save-rinse solution can be utilized fully. Where evaporation losses are high, this is easily done; when a solution is maintained at room temperature, evaporation losses are

Plating solution recovery system using steam condensate for spray and process tank supply



This article is based on a manual "Plating-Room Controls for Pollution Abatement" prepared by the Metal-Finishing Industry Action Committee of the Ohio River Valley Water Sanitation Commission. Published in July, the booklet is a guide-book of principles and practice for reducing losses of solutions and metals that might otherwise find their way into water courses. The committee is headed by W. L. Pinner, manager of research, Houdaille-Hershey Corp. Members include:

W. J. NEILL, *President*, American Electroplaters' Society
Columbus Metal Products Inc.

G. A. LOGSDON, *plating superintendent*, American Radiator & Standard Sanitary Corp. (Louisville Works)

C. L. PRICHARD, *manager*, Electrical Appliances Factory
Arvin Industries Inc.

A. M. REED, *chemist*, Electric Auto-Lite Co.

K. S. WATSON, Manufacturing Policy Division
General Electric Co.

DAVID MILNE, *chemical engineer*
General Motors Corp.

H. S. KLINE, *industrial hygiene engineer*,
Frigidaire Division, General Motors Corp.

WALTER MILLER, *asst. secretary-treasurer*
Hamilton Manufacturing Corp.

W. H. TOLLER JR., *chemical engineer*
Houdaille-Hershey Corp.

R. G. CHOLLAR, *director of research*
National Cash Register Co.

L. J. HIBBERT, *head*, Finishes Laboratories
National Cash Register Co.

C. C. CUPPS, *asst. chief engineer*
Newton Falls Division, Standard Steel Spring Co.

H. W. McELHANEY, *head foreman*
Metal Finishing Division, Talon Inc.

HAROLD FARBER, *chief chemist*
Mansfield Works, Westinghouse Electric Corp.

J. E. KINNEY, *sanitary engineer*
Ohio River Valley, Water Sanitation Commission
(Committee Co-ordinator)

likely to be small. Save-rinse solutions must then be concentrated.

In some operations drag-in can be minimized by tumbling the work in an empty tank preceding plating. By thus reducing the drag-in of water, level in the plating tank will drop through normal operation and permit additions of the save-rinse tank solution. Returning this save-rinse solution to the plating bath as frequently as possible is another aid in reducing losses of plating material to rinse water.

Consider the possibilities of an air blow-off. It will dislodge much plating solution when the work is transferred from plating to save-rinse tank.

Incidental drip of processing solution into the sewer can be prevented by installation of drip boards between tanks. The accumulation on them is flushed back intermittently into the processing tanks with save-rinse water. This also reduces corrosion on the outside of the tanks.

Rinse Effectively—Free rinsing can be assisted by utilizing racks and fixtures that are maintained in good condition—free from incidental metal buildup or corrosion. Clusters of nodules on plating racks do not rinse freely. Economy can be achieved by properly maintained and coated plating racks. Plate deposited on rack parts, or rack metal attacked by process solution, is material wasted. When the metal is attacked, the solution is contaminated. It is a frequent and deplorable practice to permit the area of rack build-up to equal or exceed the area of the work being processed.

The practice of coating in the plating field means: 1. Decreased dragout in cavities, crevices and on exposed area, which poisons subsequent solution. 2. Reduction in loss of metal that should be plated on processed parts.

Useful life of coated racks is longer than that of uncoated racks. Coating reduces rack-arm breakages. This decreases process interruptions.

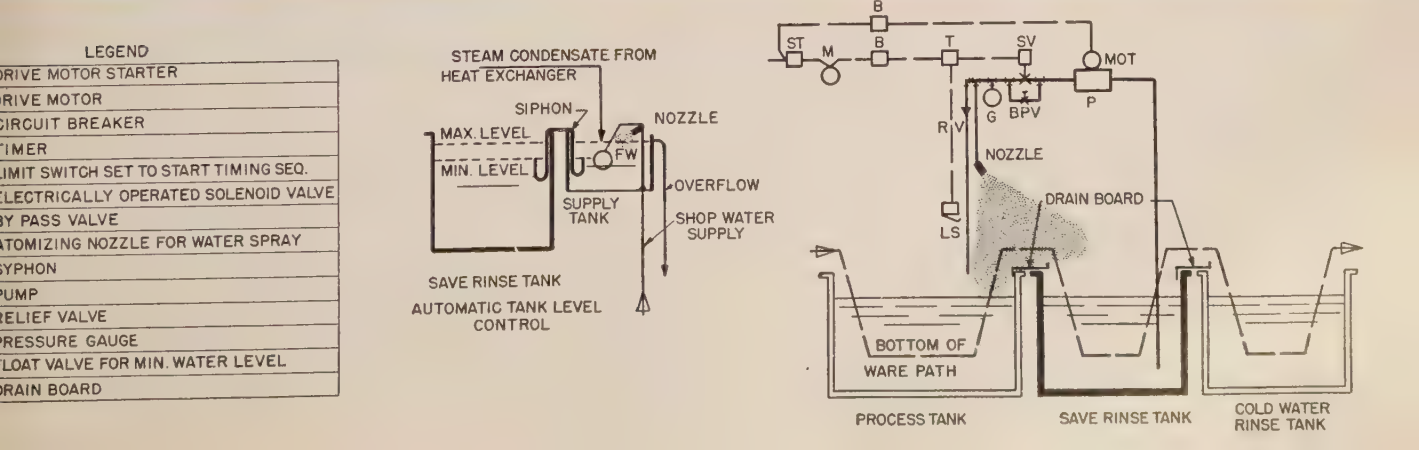
Fog Sprays—Fine-mist sprays or fog nozzles can be employed effectively on the exit end of both the processing tanks and save-rinse tanks. Fog nozzles can be operated intermittently as the machine indexes. Foot-pedal operated valves can be utilized on manually-operated tanks.

In keeping with other sound metal-processing principles, parts should be racked uniformly to speed up drainage. This serves a dual purpose by also avoiding contamination of subsequent processing solutions.

Thorough rinsing depends on passing the processed part through clean water. In final-rinse tanks this can be done with a minimum amount of water by providing a dam-type overflow across the full width of the tank. Fresh water should be introduced at the bottom of the end of the tank opposite the exit. Excessive amounts of rinse water should be avoided.

Prevent Leaks and Losses—Any loss of solution through leaks is costly and causes waste-water contamination. Routine inspection and maintenance of

Plating solution recovery system using rinse water for spray and condensate for save rinse tank supply



all equipment should be scheduled, including inspection of tanks when empty.

All pipelines and other equipment used for transferring solutions should be in plain view. Filters, pumps and similar equipment should be mounted over collector tanks or drain boards that lead to tanks.

Pipelines for filling process tanks should discharge above the normal solution-level. The operator then can tell when the supply is off or on. Also, an air-break prevents back siphonage and prevents the possibility of contamination of drinking-water systems.

To prevent foaming when wetting agents are present in the solution, make-up should be added through a funnel and a pipe extending below the surface. The water inlet should be located above the funnel to permit visual control.

Level-control float valves can prevent overflowing in case of a break in the steam line, or if the make-up feed line is left open.

Save Baths—Storage tanks, sumps or pits without drains may be the means to save a bath if a processing tank springs a leak. This safeguard unit is usually located below the process tank. A flange or curb will prevent floor-wash waters from filling this sump or pit. Solution caught is returned to process tank.

Floor drains offer a temptation for quick, easy, and unreported disposal of spills of solution or oil. Plugging the drains necessitates dry-spill disposal by sweeping or shoveling some inert adsorbing medium, such as Fuller's earth. This method of cleaning floors is particularly applicable to chemical-storage rooms where protective measures should be instituted against loss by spilling or leaching.

Salvage Solutions — Why purify? The expensive and ill-advised practice of discarding solutions which could be purified still exists. This practice continues in spite of published data on purification. Money goes down the drain when solutions are discarded. Extra expense and difficulty are incurred in replacing scarce raw materials.

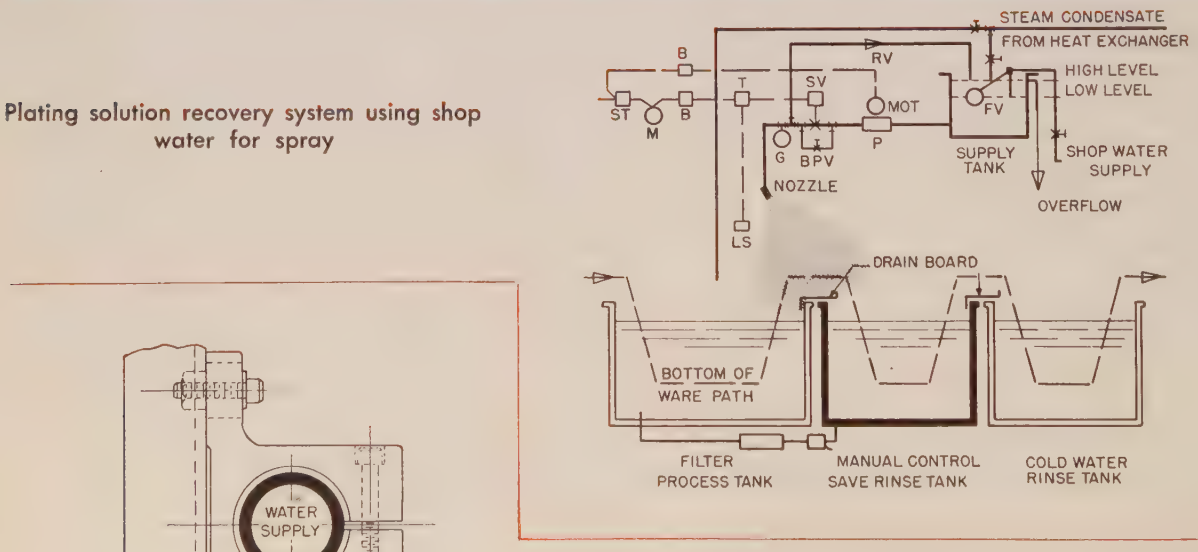
Purification procedures are established and in use for most of the processing baths. Here are eight possibilities: Activated-carbon treatments, low current-density purification, high pH treatments, oxidation, low-temperature crystallization, settling and decantation, filtration, precipitation.

Typical examples of baths receptive to such purification procedures are: Nickel solutions contaminated with all common metallic and organic impurities, upper limit of pH should be 5.6 during purification to minimize nickel-hydrate precipitation; all cyanide solutions contaminated with carbonate and metallic impurities; acid tin, copper, and zinc solutions contaminated with organic impurities; chromium plating solutions contaminated with excess amounts of catalysts; bichromate solutions contaminated with sludge.

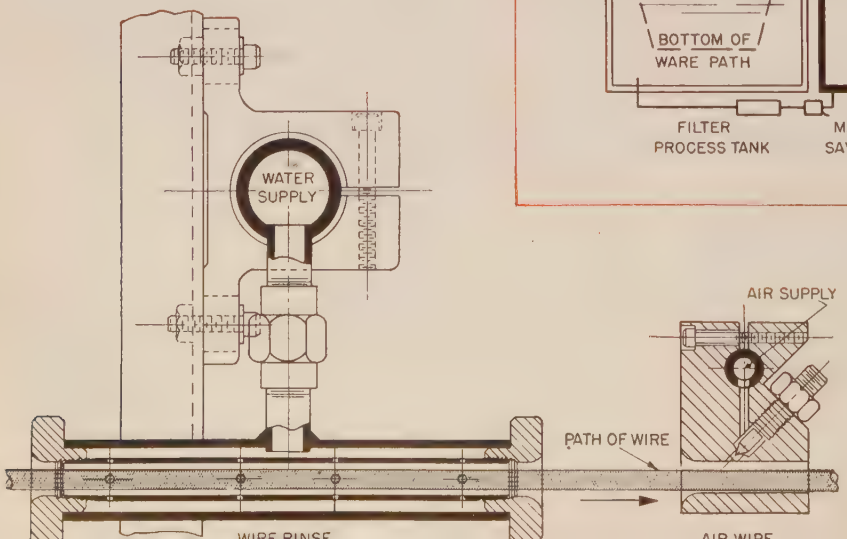
Sell or Exchange Baths—A few solutions become contaminated in normal use so they cannot be purified for further use. The possibility of selling or exchanging the condemned solutions to another industry should be investigated.

For example: An acid-pickling-waste problem was solved at one plant when it was found that a neighboring firm needed a cheap source of dilute sulphuric acid for manufacture of fertilizer.

In another case, the waste from dye manufacture consisted of sulphuric acid strong enough for pickling. Pickling with sulphuric acid produces ferrous sulphate as a waste. The dye manufacturer traded his waste acid to the pickling plant in exchange for the ferrous sulphate which he needed in his process.



Plating solution recovery system using shop water for spray



Method for reducing drag-in for wire processing. For wire rinsing, this assembly is most effective. It fully utilizes a minimum volume of water and then prevents rinse water drag-in to the next tank by drying the wire with an air wipe. Diameter of wire should be greater than one-half inside diameter of pipe

By GUY HUBBARD
Machine Tool Editor

Seen and Heard in **The Machinery Field**

TRENDS IN GEARING: This week, at the fall meeting of American Gear Manufacturers Association in Chicago, I am keenly interested in members' reactions to a number of recent technical developments in the automotive and aircraft fields.

Up in the forefront of these developments are various new types of automobile transmissions and jet and turbojet aircraft engines. On the face of it, these devices would seem to eliminate a good many gears. Knowing the ingenuity and business acumen of the gear people, however, I am sure that they already have this situation well in hand.

In similar cases in the past, I have watched them do two things. One has been to find important uses for new varieties of gears and gear products in connection with new mechanisms which have done away with some of the older types of gearing. Already I have seen signs of this in connection with hydraulic transmissions, which in addition to certain highly specialized gears, also utilize involute splined shafts cut and finished on gear industry machinery.

The other thing that I have seen gear people do, has been to forestall an impending slump by pushing the use of high quality gear products in places where products of lower quality previously had been considered good enough. This was illustrated at the end of World War II, when a number of manufacturers of aircraft quality gear products succeeded in getting their precision shaved or ground gears and multiple splined shafts adopted by builders of a wide variety of industrial machinery including metalworking machines.

The net results were continued good business for the gear and gearmaking machinery manufacturers and greatly improved performance of customers' products which gave postwar industrial machinery sales a much needed shot in the arm. Gearmaking and finishing machinery manufacturing has within recent years developed into a highly important division of the machine tool industry. Thus this drive by the gearing fraternity played an important role in the sweeping redesign program which did so much to stimulate postwar machine tool sales.

Ability to read economic and industrial handwriting on the wall is of no practical value unless the messages are interpreted correctly and acted upon promptly. A live wire association such as AGMA not only reads and interprets signs and portents but also inspires prompt and effective industry action.

THEY SET THE BED CROSSWISE: In a number of cases what has amounted to a new type of machine tool has been created by some such simple expedient as turning things upside down, or end-for-end.

One of the most recent examples is the creation of the T-lathe for machining large diameter, shallow parts now encountered in increasing numbers in aircraft manufacture. In simple terms, a T-lathe consists of a big lathe headstock with a short piece of lathe bed set crosswise in front of it. Thus, cross travel—which is the heavy phase of the action of this close-coupled machine—is taken care of by the substantial carriage running on the bed. The cross slide becomes an end slide and has only to handle the in and out action to and from the face of the work.

Great numbers of these T-lathes now are being manufactured. It can be taken for granted that every one of them is releasing either a big standard engine lathe or a standard vertical boring machine for some other work which only those machines can do. Big lathes and vertical boring mills are key machines in the defense program. Both are in dangerously short supply. It is a long drawn out and highly specialized job to build them. By easing the pressure in those directions, the T-lathe is making a major contribution to the defense program.

Unlike single purpose shell lathes and certain other machine tools designed to turn out materiel for war, the T-lathe holds great peacetime possibilities. While many of those now being built are designed for fast cutting on light sections, new models are coming along which have the power and stamina to handle really heavy work. Unquestionably the T-lathe is here to stay.

The first reaction to a development of this kind usually is: Why didn't someone think of that before? The reason is that machine tool designers tend to cling to traditional forms because machine tool users tend to distrust radical departures from traditional forms. Perhaps it is a good thing for a crisis to arise now and then which forces breaks with tradition.

EFFICIENT USE OF POWER: Throughout American history there has been altogether too marked a tendency to waste that which at the moment is cheap and plentiful. In altogether too many instances that policy has reduced us from a nation of plenty to something dangerously close to a "have not" nation during a relatively short period of spendthrift use of resources. It has happened in the lumber industry, and the present frantic drive for scrap indicates that it has happened to some extent in the metal industries. What about power?

In the metalworking industry it long has been a proverb that power is the cheapest thing in the machine shop. The implication is that in production machining, no one need worry too much about power consumption as long as metal is ripped off at top speed. Study of our wasteful industrial past should cause us to question prodigal use of power in machining. Increasing occurrence of power shortages in our big industrial centers should warn us that a day of reckoning may be at hand.

Remarkable efficiency is achieved today in the generation of power in central stations. Scientific design and scientific grinding of cutting tools should be much more widely applied to make machine tools more efficient in the use of this power.

By F. C. BADKE

Overhead Handling FACILITATES AUTOMOBILE SEAT SPRING PRODUCTION

Full utilization of floor area for manufacturing purposes, better control of material in process are among the advantages accruing to one company using tramrail conveyors with rack carriers

FROM incoming wire storage to shipping department corrugated springs for automobile seats made at the Bedford, O., plant of Universal Wire Spring Co. travel the entire way through all manufacturing steps on Cleveland Tramrail equipment. Because of experience with various handling methods in their two other plants, the company knew the important advantages of overhead handling equipment. It was possible to use overhead space for handling materials and thus reduce the size of or eliminate entirely aisleways and utilize more of the floor area for production purposes.

Ideal Solution—Overhead equipment with rack carriers appears to be an ideal solution to the materials handling confusion. Tramrail trucks, as Universal calls them, cannot be removed from the overhead track. They cannot be lost in out-of-the-way places. They travel exactly the path determined by the plant engineering department to be the best. And they advance in the right order. There is no question whether the material has been put through a process or not.

This is an important point because scrap loss has been a sizable item in other plants where it has been possible to pass by and miss completely a manufacturing step. In fact, the saving from elimination of scrap loss can easily be so large as alone to justify the cost of the overhead system.

In the wire storage department, a 2-ton fully motorized crane unloads trucks of wire and places it in storage. The same crane also loads coils of wire onto special spindles known as "high-hats" and takes them to corrugating machines and single coils to Baird 4-slide machines in the adjacent department. A 2000-pound hoist carrier operating on a single arch beam track, parallel and just below one of the crane run-

Wire storage department is serviced by a 2-ton fully motorized crane which unloads trucks and places wire in storage or on special spindles, "high hats." Wire on the spindles is carried to corrugating machines and single coils to Baird 4-slide machines. The 2000-pound hoist carrier operating on a single arch beam track parallel and just below one of the crane runways, carries coils from the high hats to the reels of the corrugating machines

Loaded racks being moved from heat treating oven onto spur tracks serving the input end of several folding machines

ways, lifts the coils of wire from the high-hats to the reels of these machines. The coils weigh 275 pounds and six of them are usually placed on a high-hat. This electrified equipment is kept busy 16 hours a day.

Each Machine Served—The hand-propelled overhead rack carrier system starts its work at the spring corrugating machines. Spur tracks from the main line permit the overhead racks to be run alongside each corrugating machine, enabling the operators to place the corrugated wires directly on shelves on the carriers. A carrier has eight shelves, each of which accommodates 225 pounds of corrugated wires or springs; thus a fully loaded rack carrier has 1800 pounds of material.

When full, a carrier is routed through the adjacent cleaning and heat treating department. A Tramrail lift section hoists the entire rack with a load high enough so that it clears the top of a three-section dip tank. The carrier is then pushed over so it can be lowered into the cleaning solution. After sufficient time, it is raised, moved and lowered into the middle or rinse section. Next it goes through the third section of the tank. When the dip operations are completed, the lift section is interlocked with the main overhead track and the carrier advanced into a heat treating oven.

Usually two or three carrier loads are taken through the dipping sections at one time, thus while one is being cleaned another is in the second or third sections or both. Carriers have special oven wheels permitting the racks to remain in high temperature ovens for long periods of time and yet run smoothly and freely.

Empty Carriers Routed Back—Some of the loaded racks are moved from the ovens onto spur tracks serving the input end of several folding machines in which the springs are folded. The folded springs drop into tote boxes placed on other Tramrail carriers on spur tracks serving the output end of the folders. Empty carriers at the input end of the folding machines are routed back to the starting point at the corrugating machines.

The folded springs continue by the overhead route through heat treating ovens and through corrosion resistant dip tank where they are completely coated. This is accomplished through use of a lift section which dips the entire rack and load into the solution.

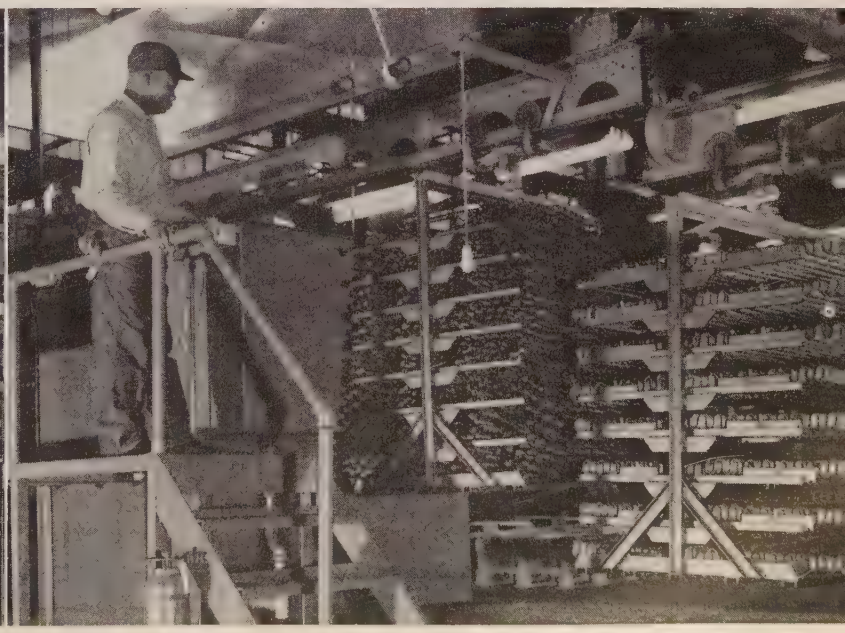
Adjacent to the corrosion resistant dip tank is a grilled floor drip section over which each carrier is permitted to remain for several minutes to permit excess soluition to drop off. Just beyond this, the carriers pass through a dry-off oven which completes the work on the springs. The springs are then moved on a few feet farther to the packing and shipping department where they leave the Tramrail system. They are placed in corrugated boxes and made ready for shipment.

No Excavations Needed—An interesting sidelight on the installation is the fact that approximately $6000 was saved because there was no need for excavating and building foundations into the ground to accommodate the two dipping tanks. The lift sections made it possible to set the tanks on the floor. This arrangement also made the installation of drain pipes far easier because they could be laid just under the floor without the need of digging deep trenches. Another advantage of having the tanks on the floor is that they may be moved to other locations with minimum expense.

The entire steel superstructure to which the system is attached is supported to the building beams by hanger rods and clamps. These are easily removed, making it possible to extend, change or move the overhead rail equipment from time to time as operations dictate. This flexibility is an important factor in maintaining top efficiency and helping to keep costs down.

Folded springs drop into tote boxes placed on other carriers on spur tracks serving output end of the folding machines

Springs are corrosion-proofed in this dip tank. A lift section dips the entire rack and load into the solution



WELDING REFINEMENTS
Stressed at AWS Sessions

REFINEMENTS in welding techniques, new processes and methods of handling high temperature alloys were among the subjects discussed at the 32nd annual meeting of the American Welding Society in Detroit, Oct. 15-19. Twenty-four separate technical sessions and symposiums covering a wide variety of subjects from weldability to filler metal specifications comprised the program.

Following are abstracts of some of the papers presented:

Spot and Projection Welding Using Magnetic Force, by Wm. E. Klingeman and Harold H. Kruer, Precision Welder & Machine Co.

New tool for joining ferrous and nonferrous metals is showing promise in the spot and projection welding field. This development of applying pressure to the electrodes of a resistance welding machine by application of an electromagnet incorporated in the welder secondary circuit, has now advanced to the production tool stage.

Accurate current-force relationship makes it possible to weld formerly difficult and critical applications with a new degree of uniformity. Presently the process is being used on pure silver, coined silver and tungsten contact work along with stainless steel and copper strip stock. Pressure build-up is rapid and consistent with actual current flow. As the contact resistance of the work pieces varies, the electrode pressure applied by the electromagnet unit varies and tends to compensate in a similar degree. Function takes place automatically regardless of the skill of the operator and inertia of the moving head is not a major factor.

With the welding of materials of relatively low specific resistance, it is desirable to apply initially a low contact pressure at the interface of the parts to be welded so as to afford high contact resistance and high current flow along with the subsequent heating in the weld area, then apply a high pressure to follow up the weld. The magnetic force process accomplishes this function and at the same time actually coins and densifies the weld nugget through its forging action.

Characteristics of Spot-Welded Titanium, by M. L. Begeman, Joe C. Fontana and Frank W. McBee Jr., University of Texas.

An investigation of the physical and metallurgical aspects of spot welding titanium 75A (commercially-pure) reveals that the material is weldable under the conditions used. Weld strength of 22 gage, 24 gage, and 25 gage sheet increases uniformly with an increase in weld current and/or weld time, to about 16,000 amp and 12 cycles. Beyond this point the strength tends to decrease in both cases. Indentation is somewhat high but remains within limits. All welds fail as a plug or tear around the weld.

Electrode tip pressure has little or no effect above 600 pounds; below 600 pounds flashing occurs. There is essentially no decrease in the weld strength for a series of 400 consecutive welds. Indentations remain uniform and no pick-up is observed on the electrodes. Metallurgical characteristics of the welds appear to be good and in line with structures obtained when welding other metals.

Pressure Welding Aluminum at Various Temperatures, by M. A. Miller and G. W. Oyler, Aluminum Research Laboratories.

Pressure welding is the formation of a solid-phase weld between metallic materials, by the application of a deforming pressure, at any temperature below the melting point of the components. Three major factors in the pressure welding of aluminum, assuming optimum surface preparation and suitable die design, are temperature, pressure and time. These factors are closely interdependent and capable of graphical representation.

At temperatures below about 500° F, the extent of deformation during welding, largely established by the unit pressure, determines weld efficiency. At elevated temperatures, diffusion is also an important factor in the establishment of metallurgical bonds. As a consequence, unit pressures decrease rapidly as temperatures increase above 600° F and approach the solidus temperature of the alloy being welded.

Hard Facing for Impact, by Howard S. Avery, American Brake Shoe Co.

Wear, defined as deterioration due to use, is caused primarily by mechanical, chemical and thermal factors. Mechanical factors operate through stress; impact is one of the important stress producers.

Hard facing, one of the important techniques for minimizing wear, can provide effective protection against deterioration from impact provided the alloys are properly selected and used. The most appropriate hard facing materials for such service are martensitic irons, martensitic steels and austenitic steels. These are suitable for light, medium and heavy impact respectively.

Flash-Welding Components for Aircraft Applications, by J. H. Cooper, Taylor Winfield Corp.

Use of resistance flash-butt welding of alloy steels subsequently heat treated to high strengths has greatly expanded in the last few years. Such typical chrome-molybdenum steels as SAE 4340, 4130, 8740, etc., are flash welded to form jet engine rings, aircraft landing gear, struts, control arms, hydraulic cylinder barrels and piston assemblies, aircraft propeller blades, army tank track rollers, bogie arms, track rollers, etc.

Loading requirements in testing and field service requirements on such welds are high and heat treatment to strengths of 200,000 to 225,000 psi are not uncommon. Control of the process variables to avoid dependence on human skill and thus make for a high degree of consistency of quality has progressed substantially.

Increased work sizes call for flash-butt welds in tubing as large as 20 inches in diameter and require welders with forging forces as high as 1,500,000 pounds.

Welding Fixtures for Use with Submerged Arc, by John Berkeley, Berkeley Equipment Co.

Automatic welding by the submerged arc process has opened a broad field for improved methods in the fabrication of welded parts. Automatic production welding, however, requires consideration of a number of problems inherent in the use of the submerged arc process. Among them are work handling, edge preparation and efficient

To our Colleagues in American Business . . .

The fact that a Revere Distributor is now celebrating its 125th anniversary year is an indication of the service the company has given its customers through those years. It is also another proof of the essential function performed by distributors for American industry. Most goods, whether industrial materials such as copper and copper alloys, aluminum alloys, iron and steel, or consumer articles such as refrigerators, radio and television receivers, kitchen utensils and ranges, go through the hands of distributors. Generally speaking, only the large buyers are in a position to purchase direct from manufacturers, who do not find it economical to handle the smaller orders. Yet those orders when pooled in the hands of an organization set up to handle them attain sizable totals, and hence a good distributor account is exceedingly attractive to a large manufacturer such as Revere.

A distributor serves not only the factories from which he buys. He also performs an invaluable service to his customers by making quickly available to them the products they require. A machine shop, for example, may need only a few hundred pounds of brass rod; there is a distributor within easy reach who can furnish it almost immediately. Or a contractor may want a few pieces of steel pipe and a thousand feet or so of copper water tube. Again, the distributor has them. A metal products distributor has to carry such items and an infinite number of others. The Revere Distributor who started in business 125 years ago actually has in stock 53,000 different items, cataloged, indexed, and held in warehouses ready for immediate shipment throughout its territory. Each month this stock is drawn upon by 5,000 to 8,000 customers, each order relatively small. There are many Revere Distributors with similar stocks and offering equal service.

To keep this distributor's warehouses filled with a balanced inventory, 18 people are required in his purchasing staff, which includes specialists in various kinds of materials, machines, tools and supplies. And to serve customers with information, quotations and the like, 25 salesmen are on the go constantly, calling on manufacturers, contractors, builders and stores throughout the busy industrial area in which the distributor operates. The large business done by the company is in great contrast to that of 125 years ago, when it was little more than a hardware store. The enterprise has grown in the American tradition of freedom to prosper in accordance with the principles of reliability and efficiency, fair dealing and integrity in performing a desired function.

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If you buy from distributors we suggest you remember that they are not only "central stockrooms," but have a great deal of special knowledge about the products they sell and can give you much helpful advice. Not only that, through the Revere Distributors you can be put in touch with the Revere Technical Advisory Service, which will cooperate with you on matters concerning the selection and fabrication of the Revere Metals. Our distributors, and those of every other manufacturer, render many essential services, both to those to whom they sell, and to those from whom they buy. The distributor system as it operates in the United States arose in response to the need for it. Today it fulfills that need more effectively than ever before.

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clamping, flux deposition and pick-up, and proper backing. These considerations have led to the development of new types of work holding fixtures. To gain optimum performance, fixtures have left the realm of simple welding aids and are, in essence, new types of machine tools.

Development of machine fixtures, in turn, has led to a re-evaluation of production methods previous to welding. Workpieces must be held within reasonable dimensional limits, the work must be clean, the edge preparation must be good, and the piece should lend itself to efficient handling. Fixture design is allied closely with production methods which precede welding.

Product Design for Welding, by John Mikulak, Worthington Pump Machinery Corp.

Product design and manufacturing jig tool design have limited the use of high production welding facilities such as automatic and semiautomatic arc welders. By providing universally operating gantries and jigs, a design analogy can be developed so that a major portion of the welding can be accomplished by the automatic machines.

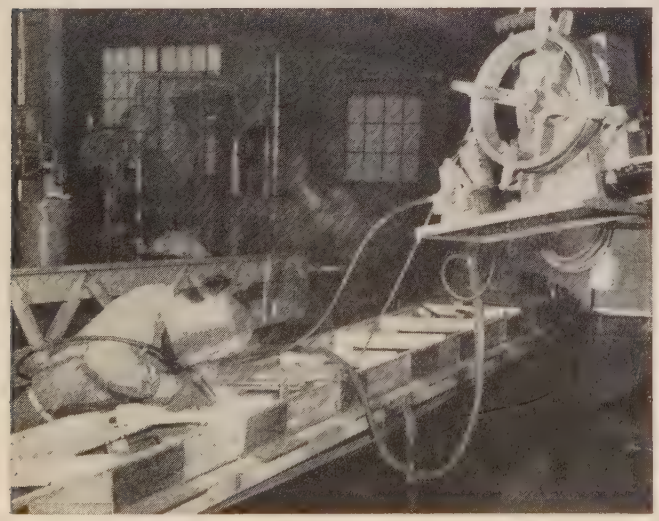
When job shop production is being produced where only one or a few parts of a particular size unit are being produced from a complete line, jig analogy should be to furnish a primary jig to which clamps and back-up members can be added or moved to locations provided on the primary jig.

Design analogy should be such that proper thermal capacity is available at the root of the joint to support the higher amperages used in automatic welding. Provision should also be made to provide joints where heavy pressure from compressed air or hydraulic operated hose jack can be used to pull plates for good fit. For the latter, on joints made by plates crossing each other, use of lap joints should be made in place of butt joints. Joints should also provide for supporting weld flux where the submerged arc is used.

Designs should be such that a major share, or all where possible, of the welding can be done from one side of the assembly. This is especially important when assemblies are being clamped into jig or positioners for welding. Handling time can be decreased by this design analogy.

Further handling cost reductions can be obtained by utilizing standard welding positioners or power turning roll equipment. By use of proper fit-up jigs mounted between or on top of this type of equipment, handling during welding can be eliminated and, further, provide use of proper weld procedures, to control distortion and use down-hand weld position where large high burn-off rate welding electrodes can be used to decrease weld cost and produce improved weld appearance. This type of rod and position produces decreased weld cleaning cost.

Prefabricated Jet Plane Hangars



PORTABLE hangars for jet aircraft to move along with shifts in the fighting front have their aluminum trusses fabricated by sigma welding equipment supplied by Linde Air Products Co., New York. A special jig built for holding the trusses positions the end sections to be welded. Sections are tack welded first. Since the arc is maintained in a shield of argon gas between the filler metal electrode and the workpiece, welds are clean and smooth, no flux is required and finishing expenses are reduced

Nested Electrodes for Metal Arc Welding, by William A. Snyder, University of Washington.

This welding process is carried out in the same manner as manual metal arc welding. The unique feature of the process lies in the electrode used. The electrode is formed of two or more core wires nested together but insulated from each other except where they are gripped by the electrode holder. Core wires may be of similar or different alloys; the insulation may serve the same purpose as the coating on heavily coated electrodes.

Use of nested electrodes offers parallel circuits for the flow of current. The current will follow the path of least resistance. Arcing occurs from one electrode until enough metal has melted away that another in the group offers a path of less resistance; the arc then switches to that electrode. High amperage may be used because each core wire has a conducting period and a cooling period. The molten puddle is large and its shape may be controlled to a degree by the pattern of core wires. Arc length is short for the amount of metal transfer.

Welding Characteristics of Materials for Aircraft Gas Turbine, by A. J. Rosenberg, General Electric Co.

Several years ago General Electric initiated a formal welding program which was to include the various materials that might prove useful for jet engines. Results of laboratory tests show that type 347 stainless steel is readily welded by the common arc and resistance processes. Type 321 offers little problems when substituted. One problem is the availability of a suitable electrode other than the type 347.

Inconel "W", Inconel "X", and Tinidur can be satisfactorily welded when precautions are observed. The low alloy materials present problems of porosity with inert arc welding, and hardening when resistance welded. In general, tempering is required.

Rosslyn metal is a special case and must be handled with care. Titanium and its alloys must be considered on their individual group merits but in general sound, ductile welds can be achieved in the commercially pure grades, with decreases in ductility as strength and alloy content go up.

Flash Butt Welding High Temperature Alloys, by I. A. Oehler, American Welding & Mfg. Co.

Flash butt welding, a commonly applied high production method of joining carbon steels, is readily applicable to the joining of the various heat-resistant alloys and nonferrous materials used in jet engine production. The techniques which must be employed for various alloys can be related to those used on carbon steels by comparing physical and electrical characteristics. Thermal treatment after welding is often necessary to realize full physical properties in the joint. The process is particularly adaptable to joining dissimilar materials.

Modern automatic hydraulic flash butt welders are capable of operating over wide ranges of welding variables, so that many different alloys can be satisfactorily welded on a single machine.

By A. H. ALLEN
Associate Editor

Research Team

Points Efforts Toward Practical Values

MANY a perspiring engineer in the field of research, design or development doubtless at times has felt a sense of frustration over the fact that when his "big idea" does come along the patents, if any, will have to be assigned to his employer and thus he stands to lose the monetary gain which might accompany successful exploitation of a new product or process. It must also be recognized, however, that the average engineer inclined toward invention may never click on the big idea and still can enjoy the security of a steady job and the wherewithal to live moderately well. And even beyond that, the engineer as an individual who might patent a workable idea does not have the capital, the plant, the equipment or a selling organization to bring his brainchild to profitable maturity. Granted these things can be acquired, the engineer often lacks the initiative, imagination and daring to follow through on his invention.

Edwin T. Goodridge and Dr. Eugene Wainer are two individuals who seven years ago decided to do something about enabling scientists to have a greater share of ownership in discoveries they might make. Goodridge was a vice president and Dr. Wainer associate director of research for Titanium Alloy Mfg. Co., Niagara Falls, N. Y. The latter was responsible for over 60 patents in the field of titanium chemistry and was an expert in metallurgy, ceramics, chemistry and physics. After long debate, the two made their move by resigning from Titanium Alloy and organizing a novel type of research activity which they called Horizons Inc. Curiously enough, Horizons Inc. began operations in the basement of Dr. Wainer's Buffalo residence, with Mr. Goodridge maintaining an office at his home in Princeton, N. J.

DR. EUGENE WAINER
. . . 60 patents
in titanium chemistry

Hub and Spokes — From this modest beginning on a few small sponsored research projects which Dr. Wainer's reputation attracted, the basic philosophy of the two men's plans began to flower. They wanted an organization staffed by the best technical and scientific brains of their four principal fields of study. They were more concerned with mental capacity than with elaborate research equipment—although that came later. They envisioned Horizons as the hub of a research "wheel" from which would radiate spokes or projects dealing with specific problems, initiated either by scientists within the group or assigned by outside interests seeking specialized research talent.

Their group would work as a freely functioning team, each man keeping his eyes, his ears and his mind open for new problems to tackle. As one phase of research might develop to the point where commercial possibilities were indicated, a company would be incorporated to carry the idea forward. Such a company would be owned partially by that part of the staff which worked on the project in order that these men and women might share ultimately in the success of the venture. An opportunity would be presented for outside manufacturers to participate in such ownership by buying a percentage of the capitalization.

The wheel began to take shape in 1947. The company centralized its research work in a building at Cleveland where a staff of 65 is now at work, 45 of them top-notch research specialists. The founders have no ambitions of becoming another Battelle or Armour Research type of operation. They plan to limit their staff to 100.

Pilot Plant for Titanium—One of the first strong spokes in the research "wheel" was Horizons Titanium Inc., established to prove the commercial feasibility of a new method of reducing titanium ores to the pure metal or alloys thereof. The method, conceived originally by Dr. Wainer, has been checked through the laboratory stage and a pilot plant is being built adjoining the research lab to produce 50 pounds of titanium metal a day. Some equipment is ready for installation and operations should be under way by the turn of the year. Goodridge and Wainer are keeping mum on the technique involved, admitting that it is basically electrochemical in nature but differing from processes now in production which convert titanium oxide to chloride and then split off the chloride molecule with molten magnesium to leave titanium sponge metal.

Dr. Wainer's long experience in the field of titanium, covering its use as an alloy in steel for improving enameling stock and as an oxide pigment for paints, enamels, etc., stands him in good stead in directing the development of the reduction process. Hope has been voiced that a price of somewhere between 28 cents and $1 per (*Please turn to Page* 85)

By JOHN PUGSLEY
Executive Vice President
Tennessee Coal, Iron & R. R. Co.
Birmingham

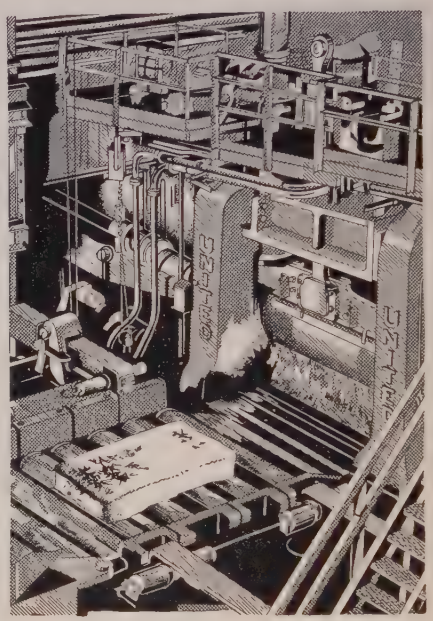
Variance Analysis
REDUCES MANUFACTURING COSTS

Program includes a planned, intensive effort of the operating and accounting departments to reduce cost through elimination of unfavorable variances from standard resulting from operating performance

PROPER analysis of cost variances provides the accountant with the primary and most effective tool in assisting management to improve operating performance. The organization problem is worked out by establishing a central analytical group at each of the larger manufacturing works. This organization includes a works analytical supervisor to direct all analytical functions, with a section under his supervision to specifically carry out the variance analysis program. The variance analysis sections generally include a variance control analyst, a variance analyst and one or more product cost analysts.

Outline of Basic Analytical Procedure—Generally the first step in a department selected for analysis is to compile loss and gain variances separately by responsibility, by works cost and expense code, and by variance causes for a period of approximately a year. This is done not only to establish a pattern of fluctuations but also to provide the key as to which items will receive priority for intensive study. After the selection of an item, all elements of cost are broken down into the finest detail. In other words, the records and practices of a mill are literally "taken apart" and studied with respect to the validity of standards, application of standards, past cost incurrence and the basis for present actual incurrence.

In many cases variances are traced back for a period of years to determine if standards have ever been attained. This is particularly true of those items for which standards have been established on historical experience. In the case of engineered standards which have never been met, there is usually a period when the variance was low. When these periods of maximum performance have been established, the trend is traced to the present-day results to establish reasons for unfavorable deviations, which may be due to an accumulation of causes. All of these comparisons with former results require careful consideration of changed conditions, revised standards during the periods surveyed and the effect of price and wage rate changes on the magnitude of variances in different periods. These conditions must be reconciled to the current performance to assure a bona fide comparison of present and past differences. It is interesting to know that all of the information used in the breakdown of conditions and causes has been found to have been previously recorded and has been available for analysis from various



production or operating reports. As yet, no new recordings of basic data have been necessary. Accumulation of figures already available has satisfied the requirement.

Blooming Mill Operating Supplies — The study of operating supplies requisitioned by the blooming mill provides an excellent example of the methods followed in conducting, servicing and measuring a variance analysis project. The study of usage of supplies in this department is one of the least complicated projects and is one in which recorded savings have come from improvement of conditions which were already reflecting favorable variances. Further, this project has influenced cost reductions of far greater magnitude in other locations.

In the beginning, it was determined that operating supplies of blooming and billet mills had incurred loss variances over a 12-month period, of only $4000 as compared to favorable variances of $21,000. In light of these results, the possibility of cost reduction did not appear to be great. However, in line with the program of studying both gain and loss variances, the analysis was made. Standards had been estab-

From a paper presented at annual conference of National Association of Cost Accountants, Palmer House, Chicago, June 26

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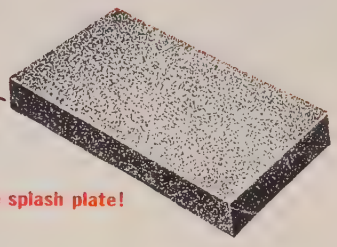
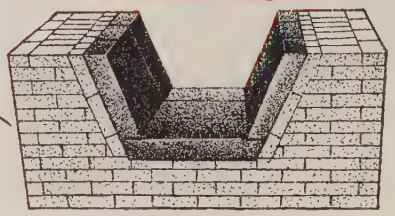


For the splash plate!

For the runout troughs!



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lished on a basis of usage during the first half of 1947. Actual quantities used for this period were determined by individual items from a study of stores requisitions. These quantities were evaluated at current prices and compared with usage during the latter part of 1948. While it was found that usage in the current period was at a lower level from the standpoint of overall quantity than before, the use of certain items reflected considerable increase, and there were items such as cotton waste, rags, gloves, flashlights, paint brushes, etc., whose disbursements in both periods appeared to be abnormally high.

Results of the analysis were reviewed with mill management and it was decided to set up a control which would present daily issues by items, quantities and the name of the person issuing the requisitions. Control over the use of operating supplies by the blooming mills has resulted in a further reduction below standard allowances at the rate of $10,000 annually.

Analysis of operating supplies used by these mills has led to favorable reactions in other locations of this works. On an overall works basis, 12 of the so-called "pocket" items, the issues of which had appeared to be abnormally high, were selected for special study. From central storehouse records, annual issues were determined and evaluated as follows: Cotton waste and rags, $50,000; three types of gloves, $26,000; electrical tape, $16,000; flashlights and batteries, $7000; paint brushes, $6000. These as well as expenditures of $6000 for padlocks, carpenter rules and pipe wrenches, reached the total of $111,000 during one year.

This information was brought to the attention of the works management and through its efforts the use of the 12 items has been curtailed to $36,000 annually. Special controls have been instituted to aid the operators in their efforts.

Blooming Mill Yields — The most substantial cost reduction results to date have been achieved through the improvement of yield of blooming mills and open hearths. During the period that the variance analysis program has been used in pointing out and evaluating causes of low yields, there has been a marked improvement in unfavorable yield variance incurred at these locations.

At the start of this project it was ascertained that metal loss and production of scrap by blooming mills were causing unfavorable yield variances of $202,000 annually. By analyzing the production of these mills on a day-by-day basis and by individual heats of steel, most of the loss was traced to piped steel, irregular pouring practice by the open hearth, discrepancies in weight of heats charged, heavy rolling and mill cobbles. Going still further into the problem, the piped steel was detailed by metallurgical specification and traced to the producing open-hearth furnace. Over and underpouring of ingot molds was followed back to the furnace and to the pourer responsible. Steps were taken to insure more accurate scale weights of heats charged, heavy rolling was reduced by increasing the frequency of test weighing of the product, and mill cobbles were detailed by product and by rolling crews. Comparison of present-day results of these mills with the selected base period indicates that the desired trend of improvement has been established. Yield variances have been improved at the rate of $185,000 annually.

It should be pointed out that some of the causes of low yields in the blooming mills were traced back to the open hearth where, prior to the start of the mills projects, yield variances also had been unfavorable to an extent of $500,000 per year. With this situation being true, it would normally be expected that improvement of blooming mills yield by correction of causes contributed by the open hearths would further reduce the yield of the furnaces. However, the reverse has occurred. By close supervision of the various factors involved open-hearth yields have improved at the rate of $342,000 annually.

Taking the open hearths and the blooming mills as a unit, yields have improved at the rate of $527,000 annually. However, even with these gains, there still remains at the two locations unfavorable yield variances of approximately $157,000 which are being made the subject of periodic follow-up studies in order to assist operating management in their efforts to achieve maximum improvement.

However, to improve the rate of savings in good product yield, it has been necessary to develop follow-up studies of unimproved factors and of new conditions contributing to unfavorable performance. After initial corrective action is taken, certain items contributing to unfavorable performance become isolated or are uncovered by operators' observation. These items require special emphasis on the part of mill management and periodic studies are necessary to keep them in the foreground.

Several follow-up studies of excessive scrap pro-

Rectangular TV Tubes Formed

KEEPING abreast of television tube demand RCA Victor Division, Radio Corp. of America is using a 900-ton Bliss No. 314 press at its Camden, N. J., plant to form television viewing tubes. Stainless steel blanks are first spun into round form and then placed in the huge press to form the rectangular tube. The cones are later sized in a drop hammer press, undergo a hole piercing operation and have their sides trimmed. After a caustic wash they are ready for shipment to the company's tube manufacturing plants for final assembly

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Department "F"
Lancaster, Ohio

duced in the blooming mill and open-hearth departments have been released. As an example, one of these resulted in a standardization of lengths of slabs produced on the blooming mills for production of bars for use at the sheet mill. This involved a study at the sheet mill and enabled the blooming mills to roll larger quantities of one size with a considerable improvement in yield. The principle of follow-up is a vital part of each project.

Coil Breaks at Electrolytic Cleaners—A study of coil breaks on the electrolytic cleaning lines was somewhat different than other analyses. Generally analysis is confined to all the causes contributing to a single variance classification. However, in this case one factor affected two variance classifications in not only this operation but also in subsequent processes. An evaluation of the effect of coil breaks on all operations emphasized the need for corrective action.

In order to illustrate the point more clearly, it is necessary to first visualize the manufacturing processes involved. At the electrolytic cleaners steel strip, usually 28 or 29 inches wide and approximately 0.0125-inch thick, is uncoiled from 12,000-pound coils and processed through the cleaner. The strip is recoiled at the end of the line following the cleaning process and subsequently annealed in coil form. After annealing the coil is again uncoiled and recoiled during a temper rolling process after which the coils are placed on shearing units to be sheared into sheets.

With these processes in mind, it can be realized that a break in the coil occurring on the electrolytic cleaning lines would create unfavorable cost variances in production rate and also in good product yield at all processing units where uncoiling or recoiling is necessary. Briefly, this means that the unfavorable cost effect of coil breaks was concealed in production rate and yield variances for three operating units. Since there were many other factors affecting both production rate and yield variances, the unfavorable influence of coil breaks on a monthly basis at each separate operation did not manifest its significance.

The first step in the analysis of coil breaks was to evaluate the added cost at each operation, based on scrap losses and delay time determined by a series of tests conducted by the operating department in conjunction with variance analysts. The total added cost of coil breaks was estimated at $435,000 annually. A subsequent study disclosed that, on the basis of one break per coil, the per cent of breaks as related to coils processed had increased approximately 200 per cent.

An analysis to determine the causes involved a detailed comparison of the number of breaks by machine, by operator, by types of steel and by strip thickness. The analysis disclosed several important contributing factors:

1. Condition of coil edges and certain surface defects created breaks.
2. Performance of individual operators showed wide variations in the frequency of breaks.
3. Changes in line speeds was a contributing factor.
4. The mechanical and electrical conditions of the equipment was an important factor.

With the presentation of this study to mill management, cost controls were supplemented to provide more essential information daily. Measured savings on this project are now at the rate of $241,000 annually. The savings can be attributed to the use by mill management of daily control information and to certain mechanical changes.

Shear Delays—A study of miscellaneous delays on the flying shears in a cold reduction department is illustrative of the benefits to be derived from an analysis of a cause to the point of ultimate detail. Too often the daily multitude of small items causing a variance loss are available for operating management's study but do not become significant until they are evaluated and projected over a longer period of time. The shears in this department are machines which are used to cut steel strip into sheets of ordered sizes, usually about 25 x 30 inches. The sheets are cut from 12,000-pound coils at a speed of approximately 600 fpm. At this high rate of operation, delay time becomes a significant factor in regard to the total output.

Miscellaneous shear delays in this department were only slightly in excess of standard time allowances in 1944 but had increased each year until 1948 when they totaled $112,000 in excess of budget time allowances. This increase in delay time had been brought to the attention of mill management through daily exhibits of delay time variance broken down into three major categories, as well as through monthly trends and in the form of a monthly delay report exhibiting the total accumulative delay cost in the current year. In addition to this, mill management reviewed and approved all daily delay reports for each operating turn. A review of this situation indicated that the accounting department must go beyond a daily or monthly analysis and develop additional information in the form of special study.

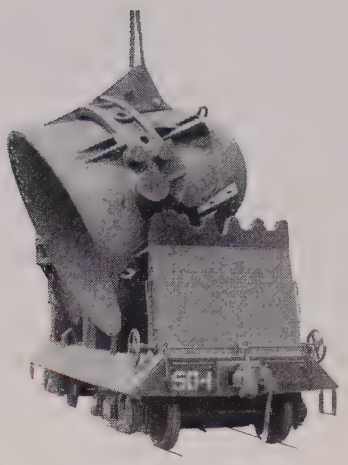
In developing this study at the shears, the delays were first broken down by type of shear and into three major causes; i.e., mechanical, electrical, crew and all other delays. The next step was to break down the three major delay causes for the latest three-month period into the finest detail recorded. This came to a total of approximately 170 types of delays, each of which was evaluated to show the cost effect in proportion to the total. The detail disclosed that in the category of "crew and all other" delays on one type of shear, one cause contributed approximately 37 per cent of the delay time. For mechanical and electrical delays, three items contributed over 50 per cent to the delay time in this category.

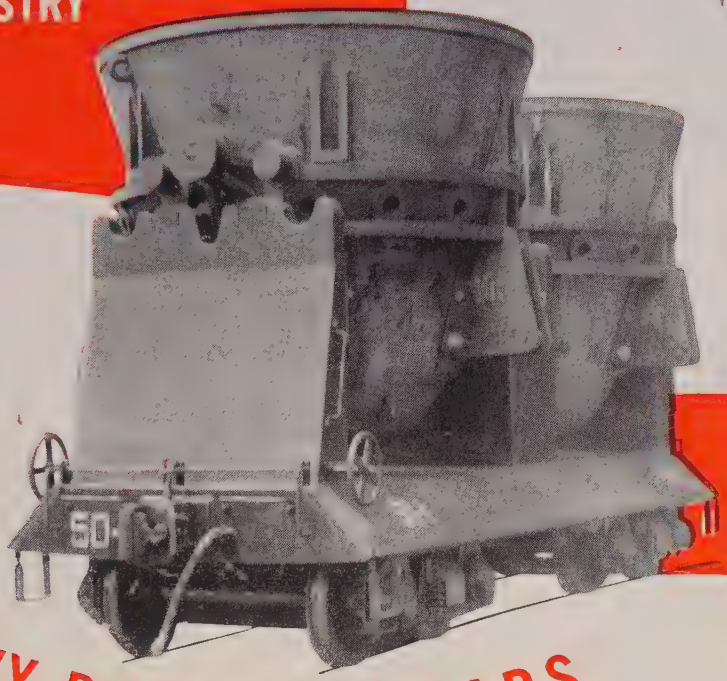
As a whole, this study disclosed that the standards in effect had at one time been met and that the major delay causes could not be attributed to deterioration of equipment or to a high level of operations precluding major repairs. After works management received this project, assignments were made to the staff to make an operating study of the situation. Subsequently a memorandum was issued to mill supervision covering five specific items to be acted upon to reduce delay time.

As a further step to aid in reducing and controlling miscellaneous shear delays, the daily control statistics have been supplemented with a line graph which plots

POLLOCK

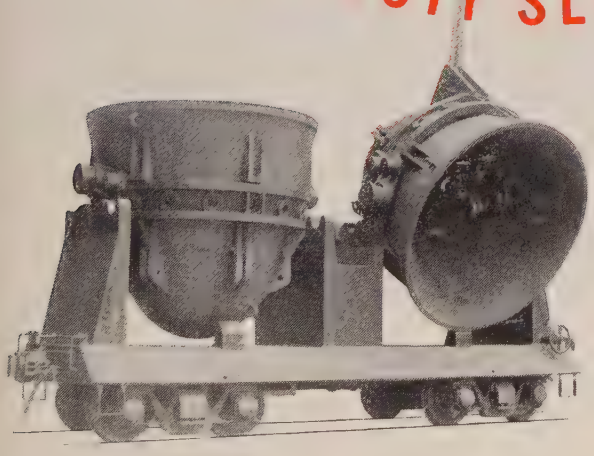
LEADING CINDER AND SLAG CAR BUILDERS FOR THE IRON AND STEEL INDUSTRY





This is one of the Pollock open hearth double-pot slag cars in service at the Edgar Thomson plant of United States Steel Company. Identical equipment will be used in other new plants now under construction.

HEAVY DUTY SLAG CARS ESPECIALLY DESIGNED FOR TODAY'S OPEN HEARTH OPERATION



● Note the heavier construction used in every detail of this double-pot, crane-dumped car. This extreme ruggedness is a necessity to assure longer life and trouble-free service under present-day big-tonnage production.

In addition to the more sturdy construction, design features contribute to open hearth operational advantages. The unit is unusually compact and permits use with minimum allowances for space clearances. Simplicity of structure reduces maintenance time and retards deterioration. Cradle arrangement permits easier, faster dumping from either side.

Each pot holds 400 cubic feet which provides 800 cubic feet slag disposal capacity within 29'0" coupler to coupler.

Most new open hearth plants have Pollock hot metal and slag handling equipment because Pollock engineering is geared to mesh with overall efficiency planning. Also for open hearth ladles, ingot cars and charging box cars, consult Pollock before you invest.

POLLOCK
SINCE 1863

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BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

time lost by crews and foremen. As a result of these actions, unfavorable shear delay variance has been reduced at an anuual rate of $57,000.

Measurement and Publication of Results—In order to effectively administer the program, all projects, after receiving the approval of works management, are measured and reported upon monthly. Measurement is obtained by comparing current results with past performance in what is considered a representative base period, that is a period generally six months or longer in which the conditions analyzed existed prior to the action taken by operating management. While the measured savings may be influenced by factors other than the variance analysis program, the savings are subject to accounting proof based on regular monthly operating statements exihibiting favorable and unfavorable variances.

It is conceivable that, with the expansion of the program, the measurement of results for an extended period might become burdensome. However, it has been found that, until maximum results are attained, continued measurement is necessary to focus attention on progress. Projects showing the most favorable results can be measured at intervals of approximately three to six months and daily controls can be used during the interim to determine the need for follow-up studies.

In order to keep the program on a works basis, the results of measurement are discussed with works management, after which they are included as a separate section in a monthly letter to the works superintendent summarizing operating results. A copy of this letter is furnished to company executives to keep them up-to-date on the progress made.

Summary of Program Accomplishments—Although the primary objective of the variance program is to achieve cost reduction through an intensive analysis of unfavorable variances, there are other benefits which have been derived:

1. Analysts are acquiring a more thorough knowledge of operations, also college trainees receive excellent training in analysis and presentation of the projects.
2. Works auditors and the accounting department are assuming their full responsibilities in connection with cost reduction and cost controls.
3. Discussion and review of the projects with operating supervisors is providing them with more complete knowledge of their actual costs as related to standards. These men are also utilizing daily cost controls to a larger extent and assist the analysts in determining the cause for adverse reflections.
4. Operators who have had the most experience with this program are requesting more and more information concerning current problems.
5. Detailed analyses disclose errors in cost distribution and application of standards, departure from cost instructions, inequalities and omissions in basic standards. In these cases, action is initiated to correct the condition.

To sum up what this program of intensive variance analysis has assisted in accomplishing to date, a total of 86 projects have been approved and submitted to management from the various producing, mining and service locations of the company. The results of these projects, having been measured for periods ranging from one to 22 months against selected base periods, represent a substantial annual variance improvement.

These favorable results would seem to warrant extension of the program to all departments of each works simultaneously. However, we prefer to stagger the program over the long-term because the inclusion of more than one department of a works at a time would produce a volume of data too large for the works superintendent to properly assimilate to-

at the Crossroads of the East

● New Jersey's most adequate transportation facilities enable manufacturers to reach rich markets in the shortest time and at the lowest cost.

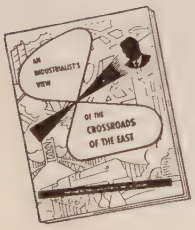
Here are more miles of railroad tracks per square mile than in any other state in the country. Fourteen railroads and the tracks of eight trunkline roads crisscross the State.

A fine network of more than 1,700 miles of paved State highways and 6,000 miles of county roads spreads over the State. A new feature of this overland transportation is the new New Jersey Turnpike which will handle traffic between George Washington Bridge in New York and the Delaware Memorial Bridge at Wilmington.

America's largest seaport facilities are wrapped around New Jersey. Through the Port of New York flows nearly half of the export and import trade of the United States. This great port, plus Port Newark, Port of Philadelphia, Port of Camden and the Port of Trenton, serve our state.

The principal cargo and passenger air lines connect this area with every major city of the world. The Port of New York Authority, a non-profit agency of the States of New Jersey and New York, operates Newark, Teterboro, Idlewild and LaGuardia.

Yes, shipping is easy at the Crossroads of the East!



Write for your copy of the new digest about New Jersey, "An Industrialist's View of the Crossroads of the East." Box C, Public Service, 76 Park Place, Newark, N. J.

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NEWARK, N. J.

NEW JERSEY
CROSSROADS
of the EAST

wards the attainment of corrective action.

The variance analysis program has proved an effective tool to promote closer co-ordination between operator and accountant. Many of the favorable results of this improved teamwork are not reflected in the actual measured savings of individual projects. Unmeasured savings which result through the more extensive use of accounting information by the operators is evidenced only in our overall cost improvement. As the coverage spreads to more departments, coupled with intensive follow-up, the variance analysis program will become correspondingly larger as a factor of cost reduction and will increase the stature of the accounting department in its participation in the management of the company.

High Temperature Problem Aid

Development and Research Division, International Nickel Co. Inc. is offering data from its files on high temperature applications of metals and alloys. These files cover service records and results of plant and laboratory tests. They are not limited to nickel alloys but include quantitative data on many other materials, both wrought and cast. Included is a work sheet, or questionnaire, designed to facilitate inquiries on specific high temperature problems to which answers may be found in these files.

Offer of this work sheet is especially directed to metal users who: 1. Are undertaking a new process with which they have not had operating experience, involving possibilities of corrosion at high temperature; 2. desire to compare the performance to be expected from other metals and alloys with that of materials previously used and found satisfactory; 3. require a substitute for an alloy or material at present not readily available. This aid for solving high temperature problems may be secured by writing to the company at 67 Wall St., New York 5.

Ore Handling Improved

A lightweight man trolley is being designed and fabricated by Dravo Corp., Pittsburgh, for an existing ore handling bridge at Granite City Steel Co.'s plant, Granite City, Ill. The trolley will operate with a 12-ton bucket and will replace the original trolley which was designed to handle a 7½-ton bucket. Two 600-series mill-type direct current motors will power it.

Research Team

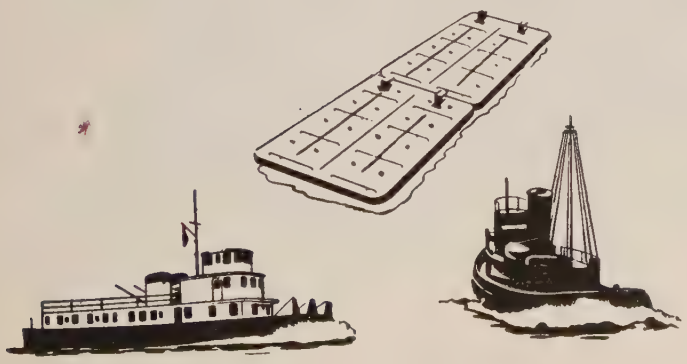
(*Continued from Page* 77)

pound may be realized when a full-scale production plant can be equipped. That this is no mere idle gossip is attested by the fact the Ferro Corp., Cleveland, has invested a considerable sum in the capital stock of Horizons Titanium.

Photos on Aluminum — Another branch of Horizons activity, currently being accelerated, is the Aluphoto Corp. of America which has acquired rights to a Swiss process for direct printing of photographic negatives on sensitized sheets of thin-page aluminum. These rights will be confined to North America, Central America and parts of South America. A program of research has been initiated by Horizons to determine the full extent of the possibilities of the process, applications and variations, including printing in color. An important advantage of the technique is the fact that aluminum "prints" are unaffected by atomic radiation, making them desirable for valuable records, files, maps and military field usage.

A third project is the Northern Minerals Co. which has been pursuing the study of wollastonite (calcium

AVONDALE
BUILDS THEM BETTER
BUILDS THEM TO LAST
BUILDS THEM OF STEEL



STEEL is the medium that has made AVONDALE famous—steel tuna clippers, steel towboats and barges, steel fabrication, construction and repair of all types for the Marine Industry, for the Oil Industry—for industry of all types wherein the properties of steel are essential.

AVONDALE MARINE WAYS, Inc.
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silicate) filter materials and their uses. A fourth is the Diwolfram Corp., concerned with the recovery of metals from industrial scrap and a fifth the Micro-Metric Instruments Co. which has developed techniques for microbiological and microchemical measurements of materials. Other programs are coming along in the metals field and as they reach the incorporation stage will hereafter include the Horizons name in their identification.

Naturally, in any research activity of this sort there is considerable secrecy necessary until the matter of patents and ownership can be worked out. In addition, some projects are directly connected to national defense and are blanketed by military security provisions. However, a few typical research programs on which Horizons' scientists have been busy, either on their own or as a part of sponsored research assignments, include ceramic coatings for metals, magnetic amplifiers, continuous casting of steel, modification of properties of ferromagnetic metals and alloys, metallurgy of zirconium, piezoelectric and electromechnical devices and materials, ferrites and ferromagnetic spinels, preparation of odd electrical ceramic shapes, including films of extreme thinness, and dozens of other tributary investigations.

Call the Doctor—The Horizons' staff like to think of itself as a group of "materials doctors" in the metals and ceramics fields, ready for consultation on any problem which may be proposed by manufacturers in these lines, and at the same time carrying on a continuing program of study and analysis based on their own conjectures and postulations. The combination of these two approaches is calculated to bring the most powerful stimuli to staff thinking and the highest promise of economic reward.

Materials Handling Study Guide

A booklet titled "The How Book of Cost Cutting Materials Handling" is available from Philadelphia Division, Yale & Towne Mfg. Co. A revised edition of a previous booklet printed in 1947, the current volume was prepared under the guidance of Dr. V. S. Karabasz, professor of industrial management, Wharton School, University of Pennsylvania.

A large portion of the "How Book" is concerned with basic background material covering types of skids, pallets and other industrial handling tools. For a copy of the 24-page booklet write the Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15.

Honed Edges Cure Carbide Ailments

By CHARLES FRANK
Carbide Co-ordinator
Artillery Ammunition Dept.
Frankford Arsenal, Philadelphia

CARBIDE tool trouble can be quickly diagnosed and corrected providing the characteristics of this modern cutting material are thoroughly considered and controls set up to maintain in practice certain necessary procedures.

Some of the principal troubles encountered with carbide in the machining of ferrous metals are due to omission of preapplication honing of the cutting edges. Unlike high speed steel cutting tools, correct chamfers honed on carbide tools will decidedly increase their efficiency and strengthen cutting edges without ill effect on normal cutting action.

Trouble Follows Pattern—In productive machining of ferrous metals, trouble from unhoned carbide tools follows a pattern, simple to "trouble-shoot" either single or multiple tool setups. The basic symptom is failure to hold size. This is a common complaint in multiple tool setups. Operator will be plagued by numerous shut downs to reset depth adjustments. This usually is followed by chip-outs or definite breakage.

A properly chamfer honed carbide tool does not require more than one or possibly two compensating adjustments per regrind. Chipouts or breakage depend largely on the number of pieces machined with one tool before being replaced.

Chamfer honing must be accomplished prior to machine application to eliminate this as the possible cause for failure in the event similar tool trouble should occur.

Causes and Cures — Knowing the symptoms of unsatisfactory behavior of ferrous cutting carbides, let us discuss causes and cure. Tungsten titanium carbide is manufactured through process of powder metallurgy involving carefully measured quantities of tungsten, carbon, cobalt and titanium combined to produce crater resistance when cutting ferrous metals.

These mixed powders are highly compressed into various blank shapes and sizes, then placed in a sintering furnace where cementation takes place largely through action of the cobalt. Finish processed blanks are brazed or otherwise fastened into suitable steel and ground by conventional methods for the use intended.

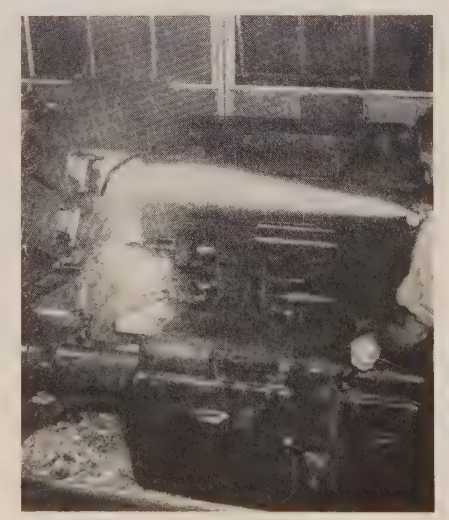
Finish grind operations usually are accomplished by diamond wheels of grain size selected in accordance with finish required. Resulting "diamond edges" will be found to be ragged or irregular under magnification.

Cutting Edges Crumble—Unhoned carbide tools when used in cutting steel, tend to crumble at the cutting edge due to this irregularity after grinding. Minute particles of the carbide break out, resulting in chip outs, serious breakage or cracking of tips. Sizes cannot be held because cutting edge is constantly breaking down the "mushing" pressure of steel chips. Relief angles are also effected and cause heeling on the work. These combined actions cause premature wearing out and breakdown of cutting tools.

The remedy is simple. Using a 320 grit silicon carbide stone, chamfer all cutting edges 0.002-inch minimum to 0.005-inch maximum to 45 degree angles using a reciprocating hand motion. If the tool contains a chip breaker, hone the back edge as well, to relieve its sharpness. Chamfer honing should be attempted only by experienced carbide grinders or carbide application men. Proper maintenance of procedure is important.

At Frankford Arsenal numerous tests have been made on machining steel cartridge cases and shells both with unhoned and honed carbide tools. Results have favored honed tools.

Machine-Mounted Protection



FIRE damage on automatic screw machines can be eliminated with a portable Redi-Grip extinguisher attached directly to the machine. The extinguisher, made by Stop-Fire Inc., Brooklyn, N. Y., is detached and operated with one hand leaving the other free to stop the machine. In this demonstration the chip blaze was given a 1 minute headway and extinguished in a few seconds without damage to the machine

Lectromelt
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Machine charging—shoveling materials through the door—was once standard practice with all electric furnaces. Labor charges were high and men were hard to hold on the job. Valuable time was lost from production. Furnaces cooled and power consumption was high.

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Top charging is typical of the many developments that Moore, inventor of the rapid Lectromelt, has sponsored throughout the years—typical of the advantages you gain by specifying a Lectromelt Furnace for melting, refining, smelting or reduction. For more details, write for Bulletin No. 7, Pittsburgh Lectromelt Furnace Corporation, 323 32nd St., Pittsburgh 30, Pennsylvania.

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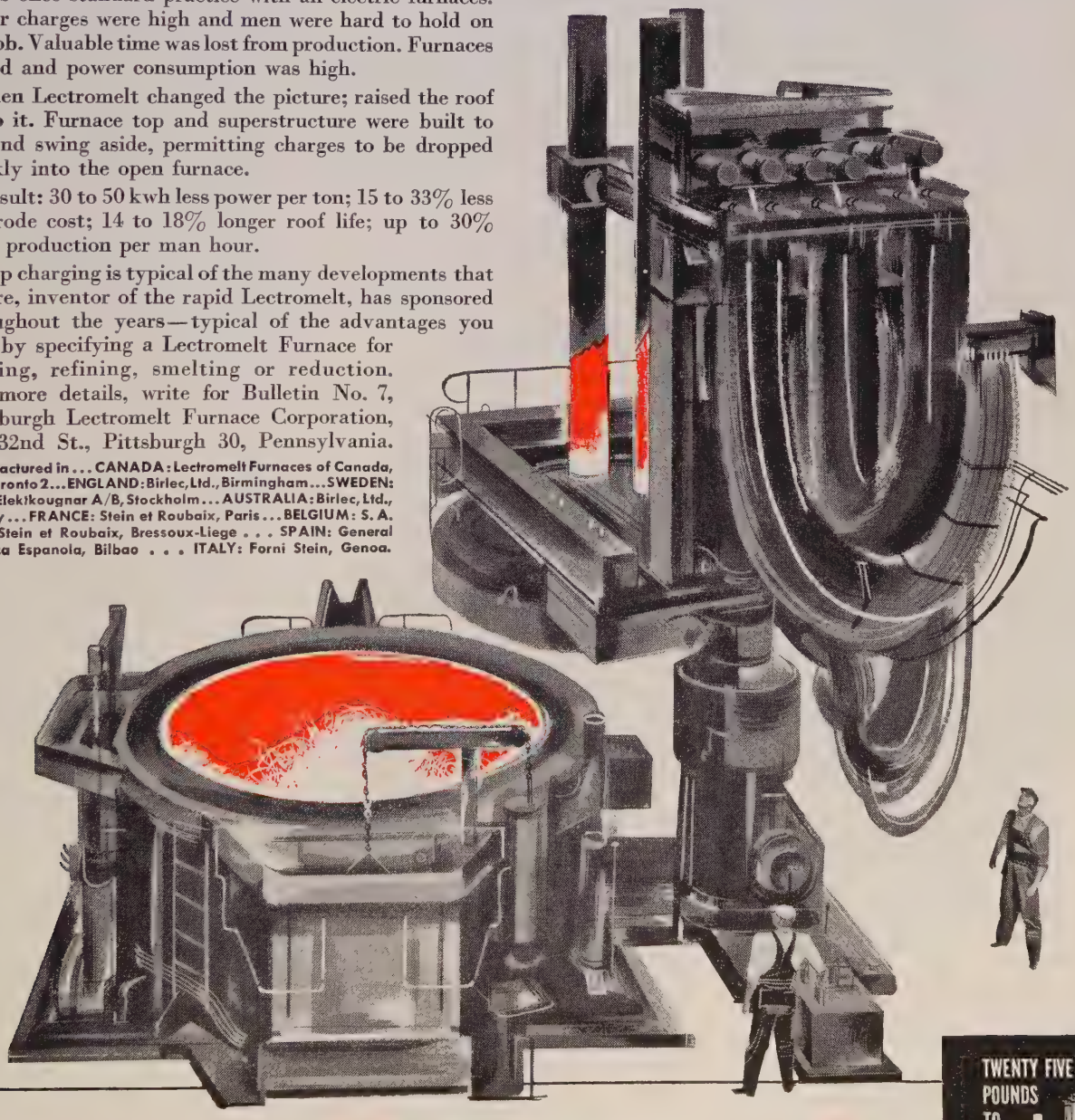

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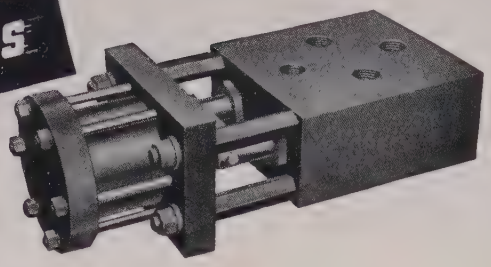

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Control Valves

Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

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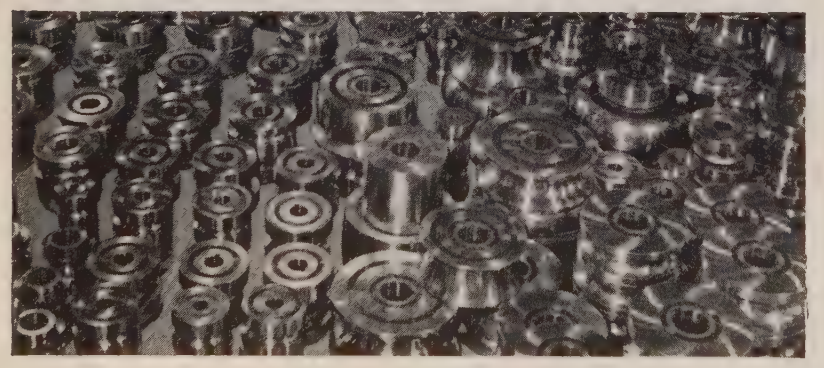

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CALENDAR
OF MEETINGS

† *Denotes first listing in this column*

October 29-31, American Gear Manufacturers Association: Semi-annual meeting, Edgewater Beach Hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: John C. Sears.

October 29-31, National Lubricating Grease Institute: Fall meeting, Edgewater Beach Hotel, Chicago. Institute address: 4638 Nichols Parkway, Kansas City 2, Mo. Executive secretary: Harry F. Bennetts.

October 29-November 1, Society of Automotive Engineers: Transportation meeting, Hotel Knickerbocker; Fuels and Lubricants meeting, Drake Hotel, Chicago. October 29-30, Diesel Engine meeting, Drake Hotel. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

October 31-November 2, Foundry Equipment Manufacturers Association: Fall meeting, The Homestead, Hot Springs, Va. Association address: Engineers Bldg., Cleveland 14. Executive director: Arthur J. Tuscany.

October 31-November 2, Porcelain Enamel Institute Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 1010 Vermont Ave., N.W., Washington 5. Secretary: Edward Mackaser.

NOVEMBER

November 1-2, Industrial Management Society: Annual time-motion study and management clinic, Sheraton Hotel, Chicago. Society address: 35 E. Wacker Drive, Chicago 1.

November 1-3, Audio Engineering Society: Annual convention & audio fair, Hotel New Yorker, New York. Society address: 67 W. 44th St., New York.

November 1-4, National Tool & Die Manufacturers Association: Annual convention, Statler Hotel, St. Louis. Association address: 906 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

November 2, American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee: Annual meeting, Pittsburgh Section, William Penn Hotel, Pittsburgh. Section chairman: H. E. Warren Jr., U. S. Steel Co., Pittsburgh.

November 2-3, Illinois Mining Institute: Annual fall meeting, Hotel Abraham Lincoln, Springfield, Ill. Institute address: 28 E. Jackson Blvd., Chicago 4. Secretary-treasurer: B. E. Schonthal.

November 4-7, National Screw Machine Products Association: Fall meeting of committee, directors and executive groups, The Homestead, Hot Springs, Va. Association address: 13210 Shaker Square, Cleveland 20. Secretary: Margaret Ballinger.

November 5-8, American Petroleum Institute: Annual meeting, Stevens Hotel and Palmer House, Chicago. Institute address: 50 W. 50th St., New York. Information chairman: John L. Dupree.

Nov. 7-9, Annual Meehanite Research Meeting: Hotel New Yorker, New York. Sponsor's address: Meehanite Metal Corp., Pershing Bldg., New Rochelle, N. Y.

November 7-9, American Society of Body Engineers: Annual technical convention and exhibit, Rockham Memorial Bldg., Detroit. Society address: 100 Farnsworth Ave., Detroit 2. Secretary: H. V. Atnip.

November 7-9, Pittsburgh Business Show: William Penn Hotel, Pittsburgh. Sponsor: Pittsburgh Business Show Committee. Secretary: J. E. Schultz, c/o Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19.

November 7-10, National Conference on Coastal Engineering: Hotel Rice, Houston. Secretary: C. E. Balleisen, c/o Southwest Research Institute, San Antonio, Tex.

November 8-9, National Conference on Industrial Hydraulics: Sherman Hotel, Chicago. Sponsor: Illinois Institute of Technology. Conference secretary: John G. Duba, Technology Center, Chicago 6.

(*Continued on p.* 89)

(*Continued from p. 88*)

November 8-10, Steel Founders Society of America: T & O conference, Carter Hotel, Cleveland. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

November 8-11, Automotive Parts Rebuilders Association: Fall meeting, Stevens Hotel, Chicago. Association address: 1414 S. Michigan Ave., Chicago. Secretary: Jack O'Sullivan.

November 9, American Iron & Steel Institute: Regional technical meeting, Hotel Mark Hopkins, San Francisco. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

November 11-13, National Association of Suggestion Systems: National convention, Hotel Statler, Detroit. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: J. R. Olson, c/o Peoples Gas Light & Coke Co., Chicago.

November 11-14, American Supply & Machinery Manufacturers Association: Mid-Year meeting, The Homestead, Hot Springs, Va. Association address: 731-732 DuPont Circle Bldg., Washington. General manager: R. Kennedy Hanson.

November 12-15, National Automatic Merchandising Association: Convention & exhibit, Public Auditorium, Cleveland. Association address: 7 S. Dearborn St., Chicago 3. Executive director: Clinton S. Darling.

November 12-16, National Electric Manufacturers Association: Annual fall meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

November 14-15, Industrial Hygiene Foundation: Annual meeting, Mellon Institute, Pittsburgh. Foundation address: 4400 Fifth Ave., Pittsburgh 13. Managing director: John F. MacMahon.

November 14-16, National Metal Trades Association: Annual convention, Palmer House, Chicago. Association address: 122 S. Michigan Ave., Chicago 3. Commissioner: Homer D. Sayre.

November 15-16, The Magnesium Association: Annual meeting, Biltmore Hotel, New York. Association address: 122 E. 42nd St., New York 17. Assistant secretary: Martha I. Hanson.

November 15-16, American Zinc Institute: Fall meeting, The Galvanizers Committee, St. Francis Hotel, Canton, O. Institute address: 60 E. 42nd St., New York 17. Secretary: E. V. Gent.

November 16, Association of American Railroads: Fall conference, Blackstone Hotel, Chicago. Association address: Transportation Bldg., Washington 6. Secretary-Treasurer: G. M. Campbell.

November 26-December 1, Chemical Industries Exposition: Grand Central Palace, New York. Manager: Charles F. Roth, International Exposition Co., New York; chairman: E. R. Weidlein, Mellon Institute.

November 28-30, Scientific Apparatus Makers Association: Mid-year meeting, industrial, optical, aeronautical and military instrument sections, Hotel New Yorker, New York. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

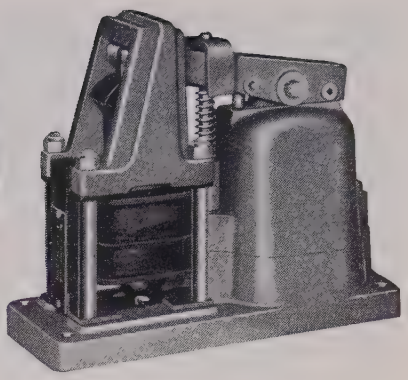
November 29, American Iron and Steel Institute: Regional technical meeting, Hotel Cleveland, Cleveland. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

November 29-30, Annual Pittsburgh Diffraction Conference: Mellon Institute, Pittsburgh. Preliminary program information: C. W. Cline, Aluminum Research Laboratories, New Kensington, Pa.

†**December 5, Steel Kitchen Cabinet Manufacturers Association:** First annual meeting, Hotel Cleveland, Cleveland. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

†**December 6-8, American Institute of Mining & Metallurgical Engineers:** Electric furnace steel conference, William Penn Hotel, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: Ernest Kirkendall.

Quick-As-Wink AIR AND HYDRAULIC Control Valves



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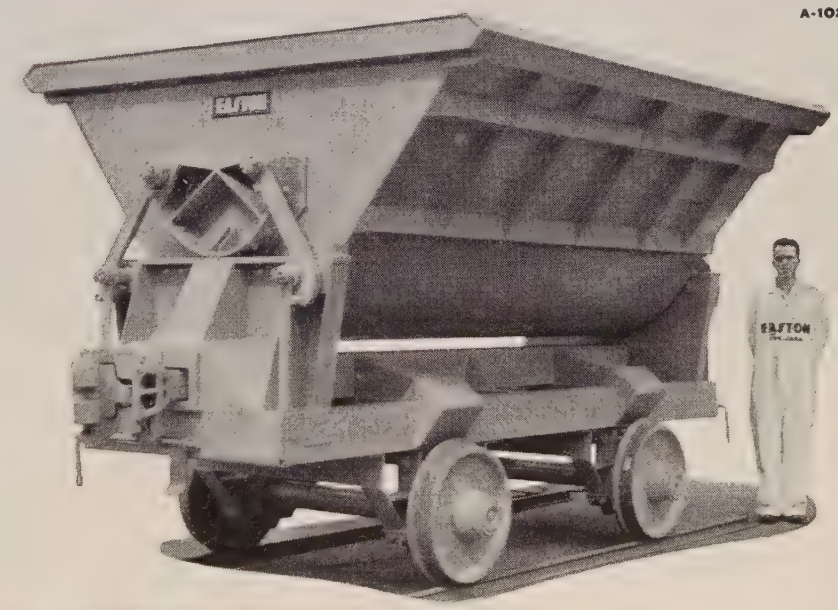
A-1025



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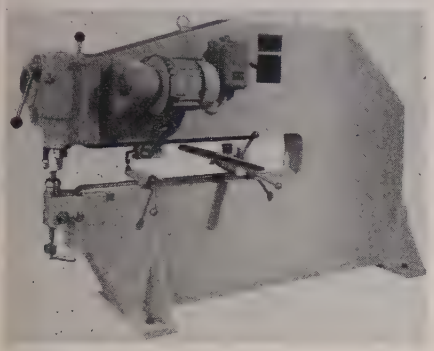
Improved Punch and Shear

USE REPLY CARD—CIRCLE No. 1

Increased throat clearance to ease inserting and handling of bulk materials is a feature of the improved 9/32-inch capacity, model D-3 combination punch and shear offered by American Pullmax Co. Inc., 2627 North Western Ave., Chicago 47, Ill. Design also includes quick locking



. . . added throat clearances eases inserting

devices on both circle and straight cutting attachments that cut down operator's set up time. Lower guide rail is graduated in inches as a further aid in speeding set up when cutting circles or squares.

Lower tool holder is redesigned and improved to simplify setting and adjusting. The model is capable of beading, folding, slot cutting, nibbling and louvering through changes in tools and attachments. Frame is welded steel plate of box type construction. All moving parts are enclosed and operate in an oil bath. Throat depth is 48 inches for clearance of large steel sheets.

High Speed Camera Modified

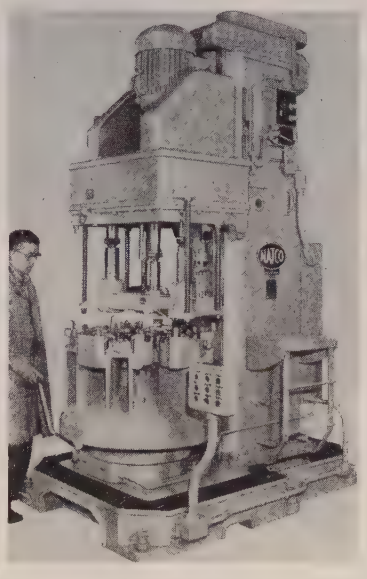
USE REPLY CARD—CIRCLE No. 2

Modification of the Kodak high speed camera to permit simultaneous recording of both mechanical and electrical aspects of a subject on the same film is announced by Eastman Kodak Co., Rochester 4, N. Y. A second lens records images on the tube of a cathode-ray oscillograph through the back of the film, while mechanical aspects of the subject are being photographed on the front. This record permits the photographer to present a complete picture of the behavior of electro-mechanical devices. It also permits easy correlation with strain, acceleration, vibration and other signals fed to the oscillograph in many nonelectrical problems. In use, the oscilloscope is placed on a table or some other support to the left of the camera. Oscillographic modification can be added to the company's high speed cameras already in use.

Rods and Caps: 20 per Hour

USE REPLY CARD—CIRCLE No. 3

National Automatic Tool Co., Richmond, Ind., is offering its model C2A vertical Holesteel drilling machine, designed for core drilling, drilling and semifinish reaming 20 connecting rods and caps per hour. Machine has a flat slide on which is mounted a fixed-center gear driven head containing four spindles mounted in anti-



. . . rotating table has three positions

friction bearings. Its three-position manually operated rotating table has a 24-inch diameter. The table accommodates one connecting rod and cap in each position while performing the following operations: Position 1—remove and load one rod and one cap; position 2—core drill one hole in rod, drill one hole in rod; and position 3—core drill one hole in cap, semifinish ream one hole in rod.

Rubber-Leather Packing

USE REPLY CARD—CIRCLE No. 4

Several advantages over synthetic rubber and wax-impregnated leather are attributed to a rubber-impregnated leather packing developed by E. F. Houghton & Co., 303 W. Leigh Ave., Philadelphia 33, Pa. Designated No. 1243 VIM, it combines lower friction and greater strength found in leather with sealing qualities, resilience and heat resistance of rubber. Packing is made from long-fiber mineral-tanned VIM leather, impregnated with synthetic elastomer. Components are bonded by polymerization process to achieve thorough impregnation and avoid mere surface treatment.

Resultant pliability permits its return to exact proportions even after being folded double, easing application in assembly. Packing's service life is extended by heat resistance of the rubber impregnant, which will not wash out at temperatures as high as 200° F. Shortage of raw materials limits present packing supply, only two styles being available: V and cup. These are made in standard sizes and supplied on rated orders.

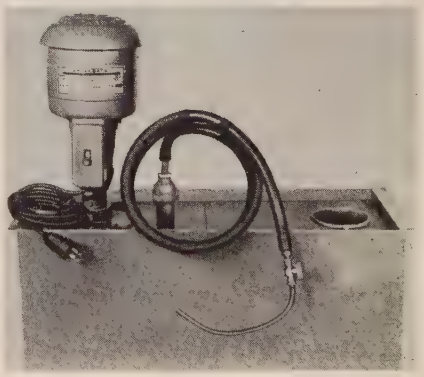
REPLY CARDS

on page 99 will bring you more information on any new products and equipment in this section.

Coolant Unit Is Portable

USE REPLY CARD—CIRCLE No. 5

Portable coolant unit, model 10-10, that pumps 30 gallons per minute up to 12 feet is available from Shellback Mfg. Co., 1320 E. Elza, Hazel Park, Michigan. Unit is designed for cooling an eight or ten spindle



. . . cools eight or ten-spindle drill press

drill press. However, it may be used on single spindle drill press, lathe, broaching machine, cutoff machine or cutter grinder, either singly or modified to feed three or four machines simultaneously. Wear on the bearing shaft is held to a minimum by a neoprene bearing in the lower part of the pump that does not permit abrasives to imbed. In the upper pump a ball thrust bearing and

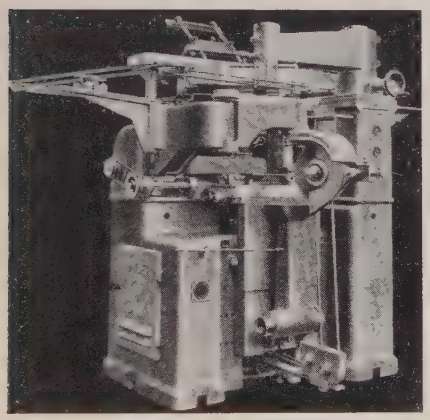
thrust collar absorb constant impeller thrust, preventing its transfer to the motor bearing.

Model has a ¼ hp, 110 v, 60 cycle motor with built in switch. Its semi-floating impeller is balanced for efficient operation. Container holds 11 gallons, is 10 x 10 x 26 inches and is complete with chip screen and sediment baffle. Neoprene hose is ⅜-inch by 6 feet long, equipped with shutoff and flexible nozzle.

Profile Grinder Enlarged

USE REPLY CARD—CIRCLE No. 6

Enlarged profile grinder, made by Fritz Studer Ltd., Thum, Switzerland, is being marketed by Cosa Corp., 405 Lexington Ave., New York 17, N. Y. Designated PSM-250 by the builder, its increased capacity permits grinding profiles up to 12 inches long on



. . . grinds profiles to 12 inches long

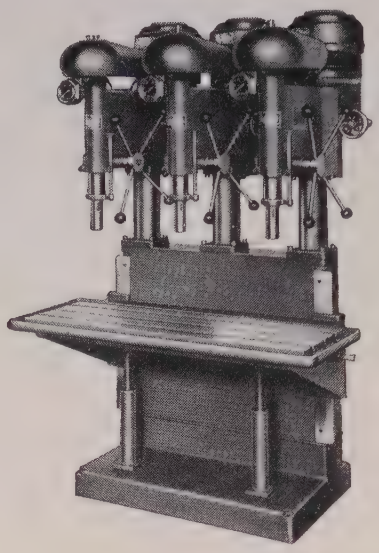
one setting. It accepts flat work pieces up to 4⅜ inches thick and round pieces up to 10 inches diameter. Maximum length of template is 24 inches; pantograph is adjustable from 1:1 to 1:10 ratio.

Grinder with suitable attachments can be used for relief-grinding of profiles of punching and drawing dies and for grinding clearance angles of flat form tools from template without distorting profiles. Automatic tracer guide attachment for guiding tracer along template is available. This uniform feeding produces improved surface finishing and increases grinding wheel life. Tracer bar can be guided by hand after loosening two screws in the tracer attachment.

Driller Increases Efficiency

USE REPLY CARD—CIRCLE No. 7

Three spindles are mounted integrally to the column on a multiple spindle drilling machine, model ME-25, designed by Sibley Machine & Foundry Corp., South Bend, Ind. This multiple spindle construction, plus several design features indicates operator efficiency on high volume production. Among the machine's features are its 25-inch swing, a variable-speed drive from which exact spindle speed is obtained for any drill size



. . . exact spindle speed for ⅛ to 1 inch

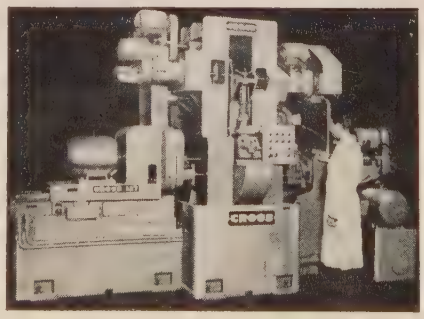
from ⅛ to 1 inch and an extra large table with coolant trough.

Machine's capacity is ¾-inch in steel and 1 inch in cast iron. Distance between spindles is 14⅞ inches; table's vertical adjustment is 12¼ inches; and working surface is 45 x 14½ inches. Five options of spindle speeds, each with a 4 to 1 ratio, are available, ranging from a low of 206-825 rpm to a high of 540-2160 with 3-phase 60-cycle motor.

Unit Processes Transmissions

USE REPLY CARD—CIRCLE No. 8

Processing transmission extensions is the function for a unit of two machine tools built by Cross Co., 3252 Bellevue Ave., Detroit 7, Mich. Tools require one unskilled operator at each



. . . finishes 125 extensions per hour

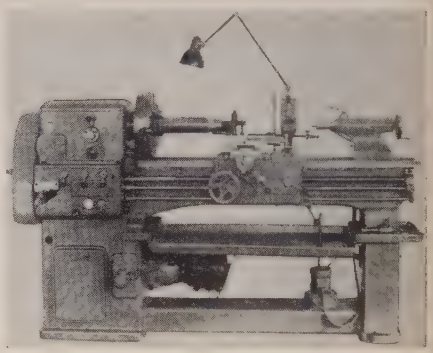
machine to finish 125 pieces per hour. First machine is a four-station trunnion type with fluid motor, power indexing. A single point tool cross faces the flange at the large end. At this machine, both ends of the extension are bored; large end is faced; flange holes in the large end are reamed; an oil groove is machined in the small end; and two holes are chamfered and tapped in the mounting pad.

Second machine is a six-station trunnion type (see cut), also with fluid motor and power indexing. In this section, mounting flange is milled; speedometer hole is drilled, bored, chamfered and tapped; and two inspection cover holes are drilled, chamfered and tapped. Both machines have hardened and ground ways, lead screw feed for tapping and hydraulic feed for drilling, boring and reaming.

Lathe Has 13-Inch Swing

USE REPLY CARD—CIRCLE No. 9

Geared head engine lathe, model DBC-175, with 13-inch swing was developed in Italy and is offered in the U. S. by Kelvin Systems Corp., 53 Water St., S. Norwalk, Conn. Speed



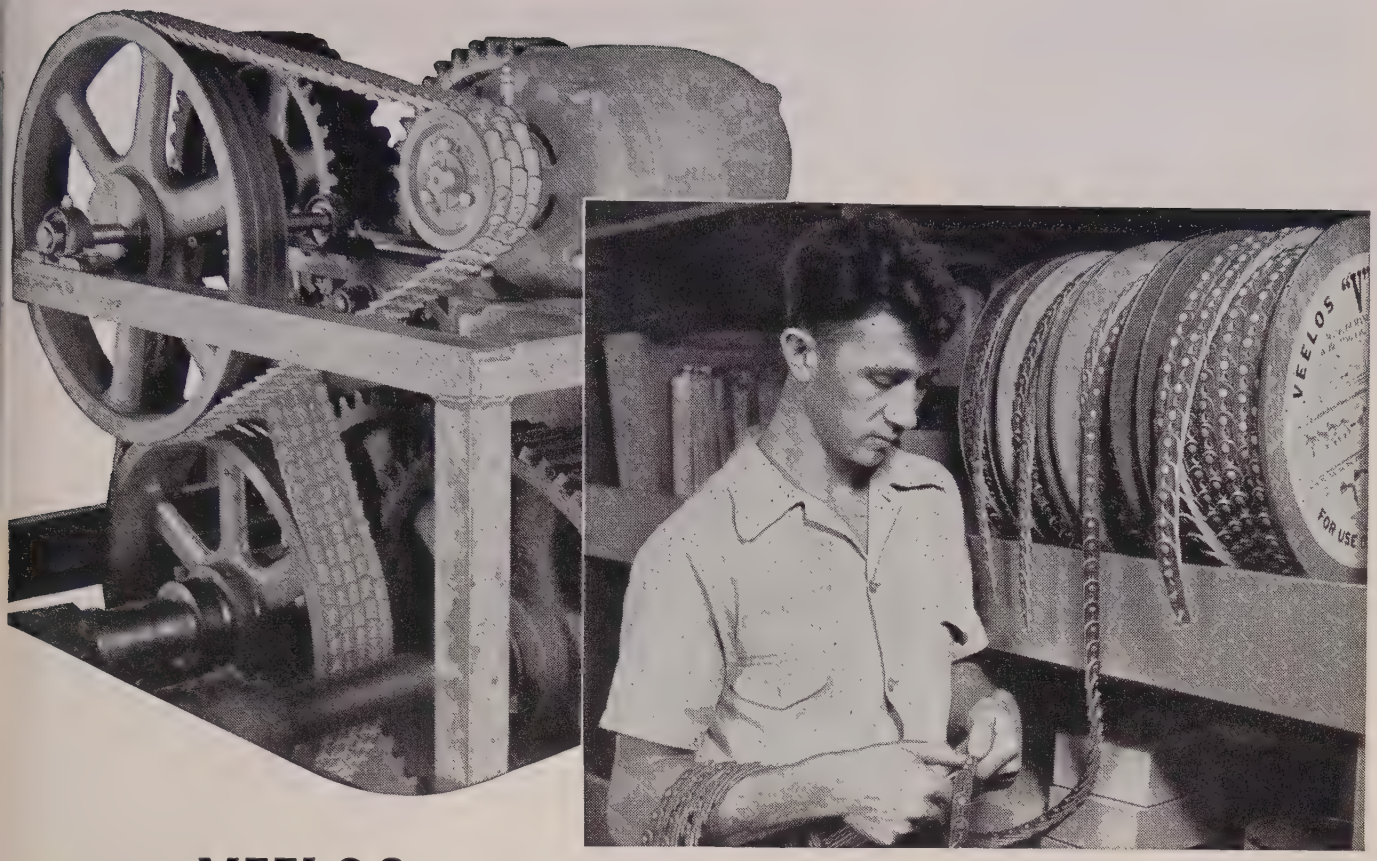
. . . 3 hp motor powers eight speed changes

range of the standard model is 26 to 1000 rpm; high-speed model has a range of 52 to 2000 rpm. Both machines have eight speeds and are powered by 3 hp motors. Both have a range of five longitudinal and five cross feeds without change of gear. Longitudinal feeds vary from 0.002 to 0.040-inch; cross feeds are from 0.001 to 0.020-inch. Lead screw and feed bar operate independently. A removable gap provides maximum swing of 20¾ inches for a distance of 4½ inches in front of the face plate.

Testing Hand Torque Tools

USE REPLY CARD—CIRCLE No. 10

A precision testing device that accurately determines torque setting of hand torque tools from 1 inch pound to 75,000 foot pounds, called model H-7500A Livermont Analizer, is offered by Richmont Inc., 808 Santa Anita Ave., San Gabriel, Calif. Its 15-inch diameter dial is designed for easy reading and makes possible a reduction in time needed for testing and setting tools. Its dial has hour



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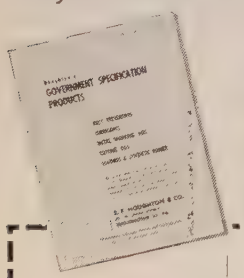

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and minute indicating hands, thus making the reading parallel that which would be obtained on a 35 foot tape. Analizer's mechanism is encased in a rigidly constructed casting to avoid damage from normal plant usage. Its entire operation is manual, making outside connections unnecessary. Adapters are available to fit each of four stations and any or all recognized torque wrenches.

Oscillograph Has Nine Channels

USE REPLY CARD—CIRCLE No. 11

Nine sources of data can record simultaneously on the 5x5x8-inch recording oscillograph, type 5-118, developed by Consolidated Engineering Corp., 300 N. Sierra Madre Villa, Pasadena 8, Calif. The unit operates from a 28-v dc power source, is compact and suited for mobile testing programs where space and weight saving are important.

Galvanometers are mounted in a stable, cast magnet block to insure uniform results and are reached easily for adjustment or replacement when the film magazine is removed. Completely light-tight, the magazine separates from oscillograph and can be handled freely without danger of film fogging. Power connection for the drive motor is made automatically by a built-in connector when the magazine is attached. Its design prevents the magazine from being improperly attached.

Rectifiers Range to 10,000 amp

USE REPLY CARD—CIRCLE No. 12

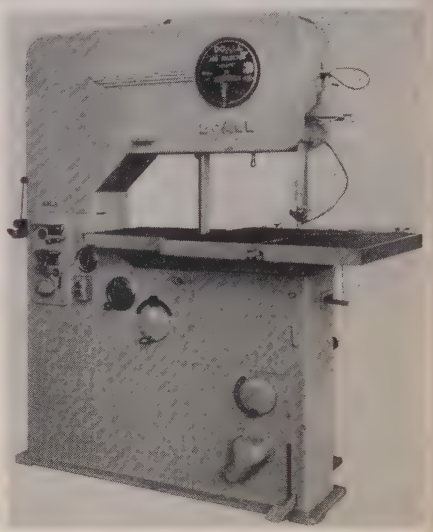
Selenium rectifiers for plating and anodizing are added to the line of metal finishing processes and equipment sold by United Chromium Inc., 100 E. 42nd St., New York 17, N. Y. Units are available from 250 to 10,000 amp current capacity, at ratings from 6 to 50 v. All rectifiers are supplied as self-contained units with built-in or remote controls to give zero to full rated output voltage. They are supplied also as basic units with no output voltage control. Units can be equipped with 36 position tap switch controls or 22 position noninterrupted voltage controls. Where infinite changes of voltage or current are required, a saturable core reactor is added. All wiring is noninflammable.

Multiple-Purpose Contour Saw

USE REPLY CARD—CIRCLE No. 13

General purpose contour sawing machine, designated V-36-3, is offered by DoAll Co., Des Plaines, Ill. The machine takes continuous saw, file or abrasive bands up to ½-inch in width. It features a three speed transmission and speedmaster drive providing variable tool velocity ranging from 25 to 6000 fpm. Its speed range permits all types of conventional metal sawing or filing, high-speed cutting of nonferrous metal and composition materials and light gage alloy friction cutting.

The unit's 36-inch throat capacity makes it adaptable to aircraft production, sheet metal and pattern shops. Saw band is usually carried over three wheels but, after several



. . . has variable tool velocity to 6000 fpm

welds, it can be used to its full life over two wheels on work requiring no more than a 16-inch throat. Variable tool speed and variable feed pressure are controlled and correlated by handwheels convenient to the operator. Its steel frame is light, unit-welded, 81 inches high and requires 40 x 70 inches floor space. Drive motor is 3 hp with magnetic starter and pushbutton control.

Vertical Milling Head

USE REPLY CARD—CIRCLE No. 14

Micrometer precision, vertical milling head made by Brown Mill Tool Co., 5443 San Fernando Rd. West, Los Angeles 39, Calif., is used for angle boring and milling on horizontal milling machines. A universal precision tool, its micrometer, vertical quill spindle feed is calibrated in 0.001-inch increments. Vertical spindle travel is 1¾ to 3 inches. The ground thread micrometer lead screw has a navy bronze stud for spindle and thrust support with set screw take-up adjustment. Adjustments are made with standard Allen wrench.

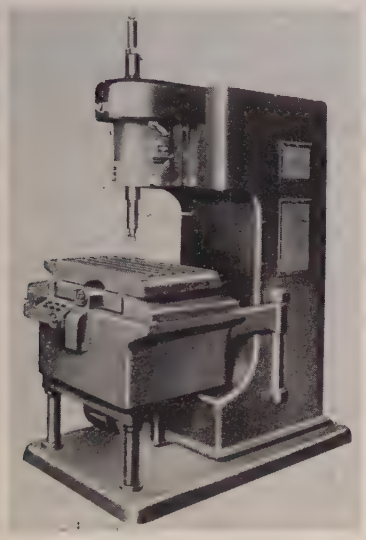
Gear housing is semisteel, precision preloaded ball bearings throughout. Gears are hardened and ground spiral and helical; spindles hardened and ground with two-piece collet tightening nut. Gear rating is 1½ to 15 hp,

running in oil. The company offers 25 models for every make and size horizontal milling machine, including micrometers on all models at consumer's option.

Compound-Table Tapping Unit

USE REPLY CARD—CIRCLE No. 15

Compound-table tapping machine that facilitates precision tapping of several identical holes in bulky pieces where multiple tapping heads are impractical, is offered by Cleveland Tapping Machine Co., 328 Lake St., Hartville, O. The work table, 28 x 42-inches, moves freely on ball bearing raceways, travelling 20 inches to either side, 13 inches forward and 11 inches backward from its normal



. . . where multiple tapping is impractical

position. This movement permits centering any hole in a 24 x 40-inch work piece directly under the tap.

Motor - operated lever - controlled raising and lowering system gives the table 18 inches vertical travel and places table top 56 inches from the floor at maximum height. Push-button-controlled solenoid brake locks the table in any transverse and longitudinal position and holds it until released. Machine has the company's standard type E head, using hardened tool-steel lead screws and split bronze lead-screw nuts to insure maximum precision in high speed tapping. Stroke is adjustable up to 5 inches. Machines are made in sizes for tapping holes from ⅜ to 2¾ inches in mild steel.

Adjustable-Speed Motor System

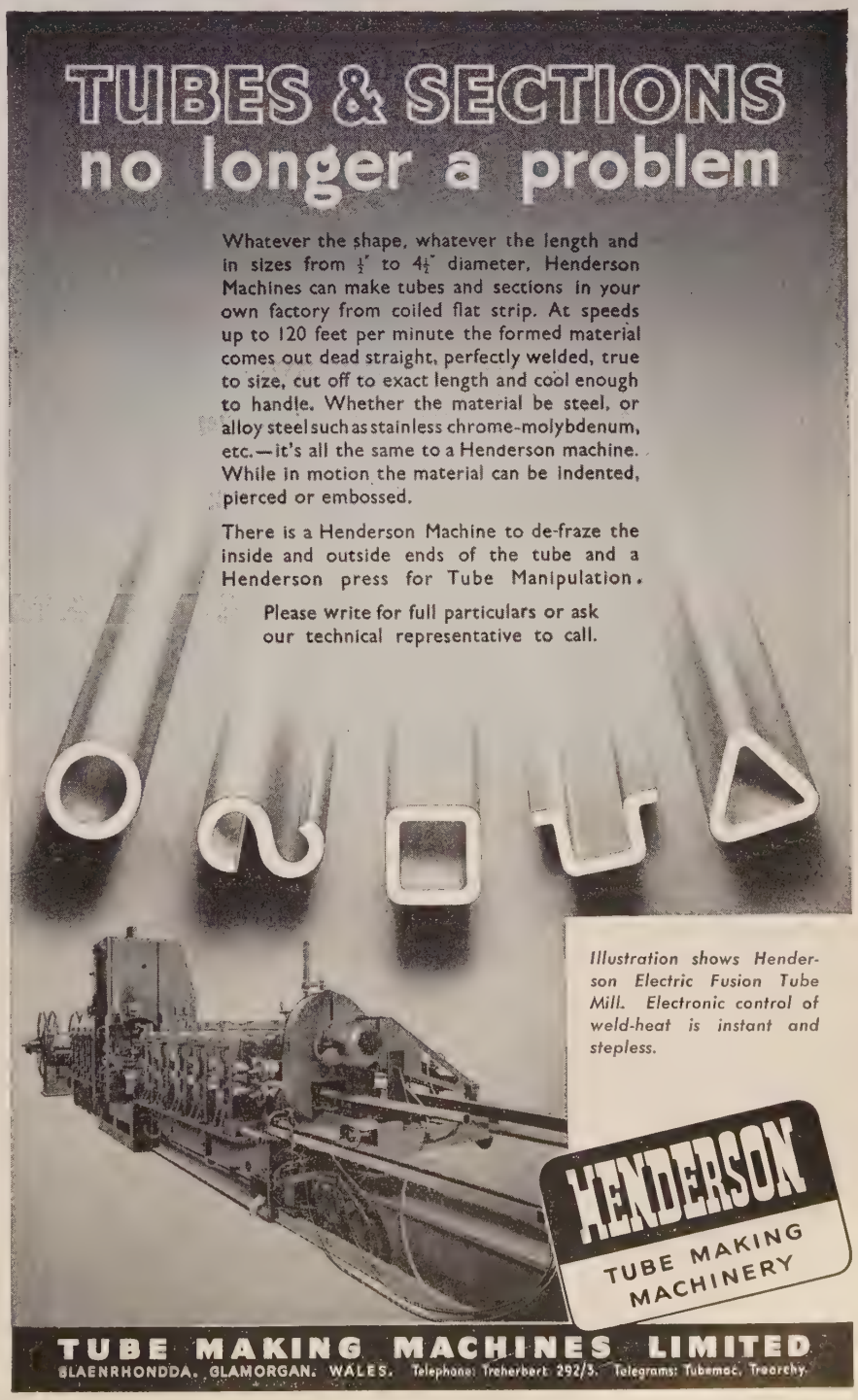
USE REPLY CARD—CIRCLE No. 16

Adjustable speed motor system of feed control for operation from polyphase or single phase alternating current circuits is offered by Baldor Electric Co., 4353 Duncan Ave., St. Louis 10, Mo. The system consists of three units: A motor-generator set; a controller; and a drive motor —any of which may be mounted an unlimited distance from the others. A single controller provides sixteen forward and sixteen reverse steps of speed adjustment at 150 rpm each to a total of 2400 rpm and provides full dynamic braking. Vernier rheostat may be connected in the circuit if finer adjustment is required. Excitation is accomplished by a full-wave rectifier of the Tungar type. Sizes are ¾ through 3 hp for operation from polyphase circuits and ¾ through 1½ hp for operation from single phase circuits.

Burners Use Either Gas or Oil

USE REPLY CARD—CIRCLE No. 17

Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis., offers a line of five combination oil and gas burners for use where gas is sold on interruptable or curtailable basis that demands substitution of a second fuel. Features of the burner line include forced air draft system that provides a single blower fan for air for combustion, assuring control to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no longer a problem
Whatever the shape, whatever the length and in sizes from ½" to 4½" diameter, Henderson Machines can make tubes and sections in your own factory from coiled flat strip. At speeds up to 120 feet per minute the formed material comes out dead straight, perfectly welded, true to size, cut off to exact length and cool enough to handle. Whether the material be steel, or alloy steel such as stainless chrome-molybdenum, etc.—it's all the same to a Henderson machine. While in motion the material can be indented, pierced or embossed.
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Illustration shows Henderson Electric Fusion Tube Mill. Electronic control of weld-heat is instant and stepless.
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the fire under all atmospheric conditions. On all burners, low-fire start is accomplished with either gas or oil. On the two larger sizes, AMG-5 and AMG-7, full modulation between high and low fire is available. Electronic controls guarantee the main gas valve cannot be opened unless the pilot flame is established. Models range from 720,000 maximum Btu gas burned in the AMG-2 size to 8,700,000 maximum Btu gas burned in the AMG-7 size.

Dual Thread Comparator

USE REPLY CARD—CIRCLE No. 18

As a companion instrument to its standard model, Hanson-Whitney Co., Hartford 2, Conn., introduces its dual thread comparator to provide a more thorough visual inspection of externally threaded parts up to 1½-inch diameter. The company's latest unit uses similar components to those of the standard, but adds a second jaw to provide a specific check of pitch diameter and back taper on very short threads whose length does not exceed major diameter of threads. This second check also indicates presence of lead or angle errors.

On previous models, the single jaw was used to check assemble-ability by means of a composite reading of pitch diameter, lead and angle. Now both readings are taken visually on a single dial indicator. The comparator may be used for both final acceptance gaging or production checking parts at the machine.

Drill Has 'Positive Control'

USE REPLY CARD—CIRCLE No. 19

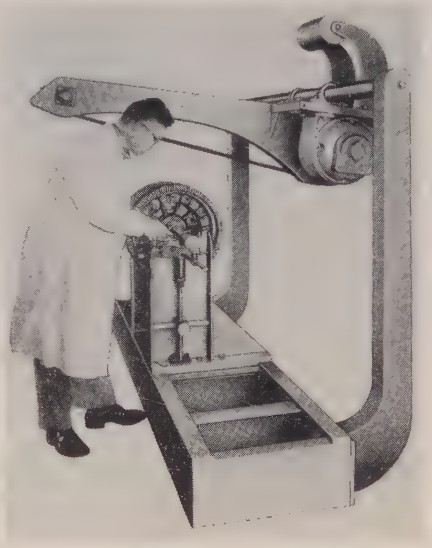
Two drilling and tapping units, completely automatic in eliminating use of gears, brakes or clutch, are offered by Locke Gage Co., 10232 Woodward Ave., Detroit 2, Mich. One unit, a heavy duty model (4000 series) has self-contained power source including a two cycle refrigerator type compressor that permits pressure adjustments from 0 to 500 pounds. It is capable of drilling up to 5/16-inch diameter in alloy steel or equivalent. Second unit is designed for light duty, (4000 S-A series) uses shop air for power against a 3 square inch piston surface and drills up to ¼-inch diameter in mild steel or equivalent.

Positive hydraulic control over thrust permits half-hole drilling and starting the drill on angular surfaces. Spindle travel is 3 inches and any fraction of this travel space can be used at any place within the overall spindle travel. Identical hydraulic check mechanisms permit control cycles and have built-in electrical solenoids that start drill unit action. Deep hole drilling attachment can be added for depths up to 3 inches and simple changes make both units adaptable for tapping and burnishing operations.

Universal Dynamic Balancer

USE REPLY CARD—CIRCLE No. 20

Industrial Engineering Equipment Co., 122 E. Fourth St., Davenport, Iowa, offers its Wagner universal dynamic balancer, providing a simple method for restoring true dynamic balance. Part to be balanced is placed on the balancer with shafts resting on ball-bearing rollers, then rotated to determine the position of dynamic unbalance so that corrective weights can be added. Driving mechanism consists of an arm with a set of five V-belts driven by a 5 hp motor. Unit is lowered by operator until belts touch the equipment to be rotated. While rotating, shafts are marked, appearance of markings showing where weight should be added.



. . . restores true dynamic balance

Balancer is 6 feet high, requires 54 x 96 inches of floor space and weighs approximately 1600 pounds. It balances equipment up to 48 inches in diameter, 4000 pounds, with 80 inches between the vertical standards.

Immersion Heaters Redesigned

USE REPLY CARD—CIRCLE No. 21

Redesign of two Calrod immersion heaters for nickel and copper plating baths and for mild sulphuric acid and chrome plating baths, is announced by Industrial Heating Department, General Electric Co., Schenectady 5, N. Y. More flexibility and portability have been incorporated by replacing old style sealing cup with junction box of terminal housing which is vapor tight.

Reciprocating Air Sander

USE REPLY CARD—CIRCLE No. 22

Detroit Surfacing Machine Co., Detroit 20, Mich., announces a pneumatic reciprocating sander. It operates with straight-line, reciprocating action that makes it desirable on many types of work as it permits sanding up to right angles and does not cut abrasive patterns.

Stabilizer Safeguards Electrodes

USE REPLY CARD—CIRCLE No. 23

A compact, moisture-content stabilizer to provide protection of low hydrogen welding rods at point of use is introduced by Fred C. Archer Inc., Milwaukee 3, Wis. Known as the Blueweld Lo-Hydrogen stabilizer, it stores 400 pounds of electrodes and may be located at any point convenient to welding operation.

Low Pressure Relief Valve

USE REPLY CARD—CIRCLE No. 24

Recommended for applications in which accurate pressure control of air or gases is vital, is type A-120 relief valve offered by Andrews-Alderfer Processing Co. Inc., Akron 8, O. It features positive accurate control on 2 psi air pressure and large volume exhaust at 3 psi pressure. It can be attached to flexible or rigid surfaces.

Cutting Tools with Solid Heads

USE REPLY CARD—CIRCLE No. 25

Superweld tools available from A. Milne & Co., New York 14, N. Y., feature solid high speed steel heads of equal section to the tool shanks. Tools are supplied ready for use; no forging or hardening is required. Tools may be dressed on standard grinding wheels.

Device for Sensitive Control

USE REPLY CARD—CIRCLE No. 26

Tel-O-Set controller, developed by Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa., is an instrument to provide sensitive, instantaneous and accurate control of flow, temperature, pressure, liquid level and other industrial process variables. It is for use with the Tel-O-Set indicator and recorder.

Electric Heating Element

USE REPLY CARD—CIRCLE No. 27

Syntron Co., Homer City, Pa., introduces a flat sheathed electric heating element for industrial heating such as is used with kettles, tanks, ovens, driers and immersion in liquids. It provides flat surfaces for

contact heating and a thin section for convection and air flow. The 5/32-inch thick, flat surfaces promote efficient radiation effects.

Surface and Angle Plate

USE REPLY CARD—CIRCLE No. 28

A combination surface and angle plate of black granite (diabase) is announced by Rahn Granite Surface Plate Co., Dayton 7, O. Surfaces of the two surface plates are finished by hand lapping process to an overall tolerance of 0.00005-inch on each plate.

Heat Resistant Paint

USE REPLY CARD—CIRCLE No. 29

Heat-Rem H-170 extra high heat resistant aluminum paint has been improved by Speco Inc., Cleveland, O., to permit air drying in approximately 30 minutes. It is capable of withstanding temperatures up to 1700° F. Utilizing a silicone base and reputed to fuse with surface metal, it forms a bright, elastic finish resistant to moisture, corrosion, mild acids, alkalis and industrial fumes.

Motor Starters

USE REPLY CARD—CIRCLE No. 30

Two motor starters, types RAR and RAS, are announced by Arrow-Hart Hegemen Electric Co., Hartford, Conn. RAR (reversing) and RAS (multispeed) feature the company's patented right angle operating mechanism. They are available in sizes 0, 1, 2, 3 and 4.

Aids in Drawing, Enameling

USE REPLY CARD—CIRCLE No. 31

American Cyanamid Co., New York 20, N. Y., introduces Aerobrite, an addition agent. In preparing steel for cold drawing, it is added to the pickling bath and is said to result in brighter steel and removal of surface iron salts harmful to dies. It can also be used in nickel plating steel sheets before porcelain enameling and in the tin plating process.

General Purpose Machinery Oil

USE REPLY CARD—CIRCLE No. 32

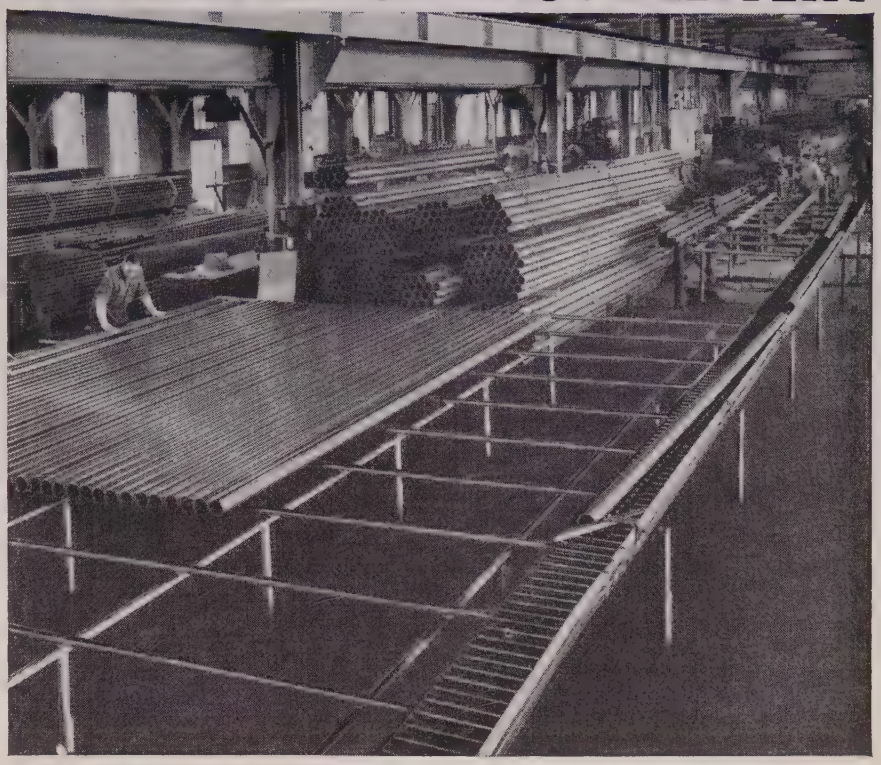
Kling-Oil, developed by Magnus Chemical Co. Inc., Garwood, N. J., is a general purpose machinery oil with metal adhesiveness. It is tacky and clings tenaciously to moving parts of machinery.

Reducer Fitting

USE REPLY CARD—CIRCLE No. 33

Designed to permit different sizes of tubing to be joined easily, Swagelok reducer fitting is offered by Crawford Fitting Co., Cleveland 10, O. It consists of a body, two ferrules and

AVAILABLE FOR FAST DELIVERY

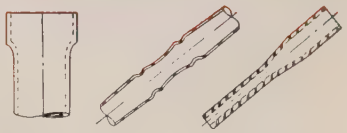


Brainard ELECTRIC WELDED TUBING

EXPANDED production at Brainard's new tube mill now permits fast deliveries on certain sizes of electric welded mechanical steel tubing. Brainard tubing is supplied straight or fabricated, sizes ½" to 4" O.D.; .025 to .180 gage.

Brainard tubing is a uniform product produced to close tolerances. It has good machining qualities, and finish can be supplied as specified: for chrome plating, painting, etc.

Integrated production facilities permit quality control throughout the manufacturing process—from ore to finished tubing. You can depend on Brainard service for *your* needs. District offices in principal cities throughout the U. S.



EASY TO FABRICATE

Brainard electric-welded tubing can be beaded, expanded, swaged, spun, flanged, upset, grooved, fluted, flattened, tapered, and otherwise formed to meet a wide variety of design requirements.

Brainard also pre-fabricates to your requirements; bending, end expansion or taper, internal or external beading, slotting, fastening, etc. Call on Brainard's tubing specialists to save yourself fabrication time and costs.

WRITE FOR FULL INFORMATION

Brainard STEEL COMPANY

WARREN, OHIO

Brainard Steel Company
Griswold Street, Warren, Ohio

☐ Send catalog listing complete specifications of Brainard Tubing.

☐ Advise availability of following sizes:_____

Your Name_____

Company_____

Address_____

City_____ State _____

NONE BETTER... America's First and Safest

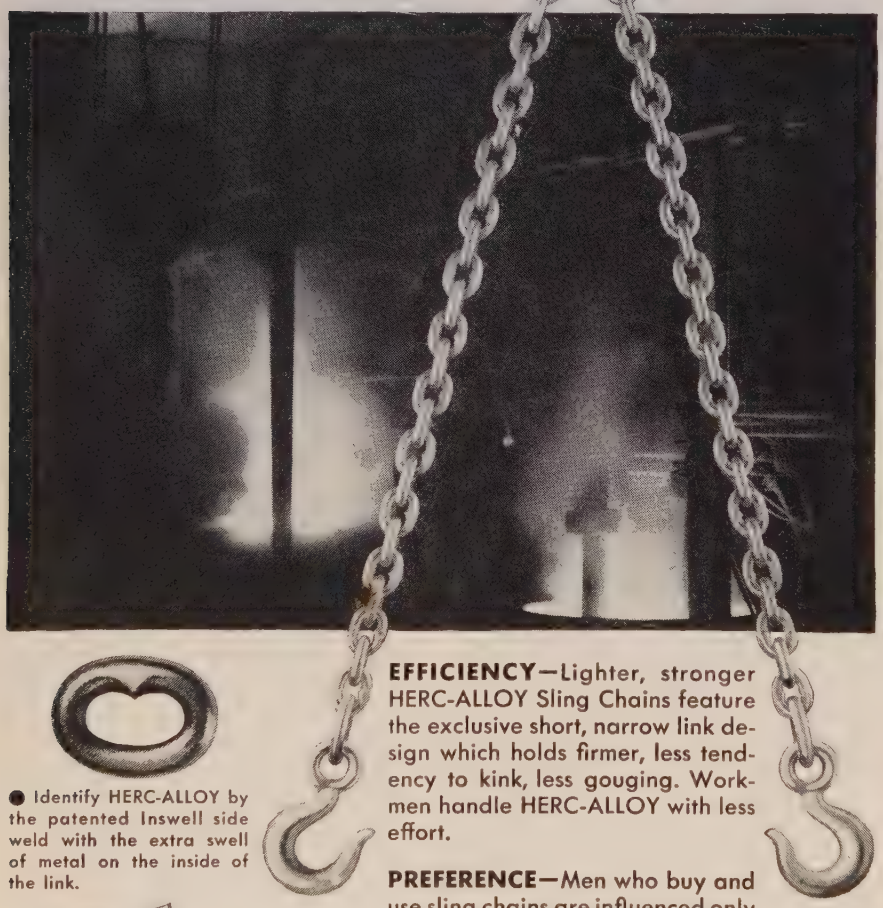
HERC-ALLOY

SLING CHAINS

STRENGTH—Size for size, no other sling chain offers a greater tensile strength. HERC-ALLOY will not crystallize—never requires annealing.

SAFETY—HERC-ALLOY Sling Chains are made to your specifications. Every new sling carries a written guarantee, is registered and tested before shipping. This registration serial number is carried at the top link.

● Serial number permanently affixed near top link for positive identification.



● Identify HERC-ALLOY by the patented Inswell side weld with the extra swell of metal on the inside of the link.

EFFICIENCY—Lighter, stronger HERC-ALLOY Sling Chains feature the exclusive short, narrow link design which holds firmer, less tendency to kink, less gouging. Workmen handle HERC-ALLOY with less effort.

PREFERENCE—Men who buy and use sling chains are influenced only by facts learned through experience. HERC-ALLOY Sling Chain preference has been built up over the years, not just by what we say, but by how HERC-ALLOY performs on the job.

Write for Data Book No. 3 which contains much useful manufacturing and application information on HERC-ALLOY Sling Chains.

COLUMBUS McKINNON CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corp.)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

District Offices: **New York • Chicago • Cleveland**

Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., and Johannesburg, South Africa.

a nut. The two ferrules plus the threaded chuck inside the nut, clinch tight around tubing wall and provide leakproof seal. Fittings are available in brass, aluminum, steel, stainless steel and Monel in sizes ranging from ⅛ to ⅞-inch OD.

Quiet-Type Vibrators

USE REPLY CARD—CIRCLE No. 34

Style EM quiet-type vibrators, made by Cannon Vibrator Co., Cleveland 14, O., are available in 1½ to 4-inch piston sizes. Ranging in weight from 9 to 140 pounds, they are used to prevent arching, hanging up and sticking in bins, hoppers, chutes, etc.

Spur-Gear Hoist

USE REPLY CARD—CIRCLE No. 35

Challenger, a spur-gear hoist, is now available from Coffing Hoist Co., Danville, Ill., in ½ and 1-ton capacities. It is built so that it may be disassembled quickly with simple tools. Unit hangs true whether or not it is supporting a load.

Device Measures Crankshaft

USE REPLY CARD—CIRCLE No. 36

A micrometer announced by L. S. Starrett Co., Athol, Mass., is designed for crankshaft measuring. Reading point, the longitudinal line on the sleeve, is on the under side of the thimble where it is visible while measuring.

Plastic Cement

USE REPLY CARD—CIRCLE No. 37

Form-A-Jig, a plastic cement compound that will not deform, move or swell during welding operations as it holds the component parts together is announced by Eutectic Welding Alloys Corp., Flushing, N. Y. It will not soil metal, does not mar surface and does not corrode.

Stainless Steel Clamp

USE REPLY CARD—CIRCLE No. 38

Series 21 quick coupling clamp, announced by Specialty Products Co., Cleveland 3, O., is designed for convenience in handling removable equipment. It features a hinged latch for quick assembly or removal.

USE A
REPLY CARD
Just circle the corresponding number of any item in this section for more information.

The Market Outlook

STEELMAKERS confront additional booking and scheduling difficulties in the weeks immediately ahead. Approaching is the 15-day period, Nov. 2 through Nov. 16, during which time they must accept January tonnage orders on a first-come first-served basis to the extent of 10 per cent of their output. They anticipate far greater demand than they can satisfy. A considerable amount of extra paper work will result, and some large mills say it may take 10 days or more to process orders. Even though available tonnage is sold out on the opening date of the booking period there is no way open to the producers to choke off the additional flow of demand.

ORDERING RUSH— Already the steelmakers are in receipt of many telegrams, telephone calls and letters from consumers outlining what tonnage they would like to have, or seeking definite instructions as to ordering procedure. Some buyers have actually sent in orders. These are being returned. Producers also are warning consumers that any wires or letters representing orders and arriving before Nov. 2 will be returned. Many prospective buyers indicate they will be at mill sales headquarters with orders in hand on the opening date of the booking period. To what extent these users can be accommodated is anyone's guess.

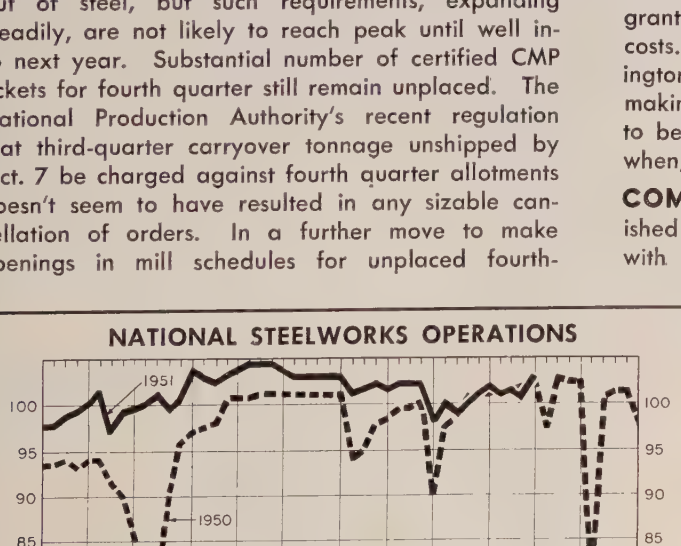
DEMAND— While pressure for steel is off somewhat from consumer durable goods lines, overall demand on the mills is unabated. Actually, the defense take is still small compared with total output of steel, but such requirements, expanding steadily, are not likely to reach peak until well into next year. Substantial number of certified CMP tickets for fourth quarter still remain unplaced. The National Production Authority's recent regulation that third-quarter carryover tonnage unshipped by Oct. 7 be charged against fourth quarter allotments doesn't seem to have resulted in any sizable cancellation of orders. In a further move to make openings in mill schedules for unplaced fourth-quarter tickets, NPA last week set Oct. 31 as the deadline for controlled materials users to cancel or adjust their outstanding orders for steel, copper and aluminum where necessary to bring totals within authorized fourth-quarter allotments. NPA officials say they have evidence many manufacturers have not complied with their order of Oct. 1 affecting third-quarter carryover, and that unless prompt action is taken to comply with regulations the whole CMP operation is endangered.

PRODUCTION— Steel ingot operations pushed 2.5 points higher last week to 103 per cent of capacity, highest level attained since June and the equivalent of 2,059,000 net tons of production. District rates jumped 6 points to 104 in St. Louis, 5 points to 90 in New England, 3 points to 106 in Youngstown, 2 points to 104 in Birmingham, 1.5 points to 106 at Detroit, ½ point to 101 in Pittsburgh, ½ point to 102 in Wheeling, and 7 points to 102.5 in Chicago.

PRICES— Except for revisions in the iron and steel scrap price schedule by the Office of Price Stabilization, steel and related product prices are unchanged. The revised scrap schedule is in line with recent recommendations of the trade, but whether the action will have the desired results of stabilizing the market, eliminating upgrading and stimulating the flow of material is uncertain. With new steel wage negotiations in the offing attention of the market is riveted on likely action with respect to steel product prices. Exceptations are the steelmakers will seek advances to offset not only any wage increase granted but also other higher general production costs. Reports circulating currently are that Washington economic stabiliation authorities already are making a study of steel production costs with a view to being prepared to handle the steel price issue, when, and if it is formally presented to them.

COMPOSITES— STEEL's weighted index on finished steel is unchanged at 171.92 and compares with 157.62 for the like week a year ago.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Oct. 27	Change	Same Week 1950	Same Week 1949
Pittsburgh	101	+ 0.5	105	3.5
Chicago	102.5	+ 7*	105.5	6
Mid-Atlantic	99	0	100	8.5
Youngstown	106	+ 3	106	0
Wheeling	102	+ 0.5	97	61
Cleveland	100.5	— 0.5*	101	0
Buffalo	104	0	104	0
Birmingham	104	+ 2	100	6
New England	90	+ 5	92	58
Cincinnati	103	— 1	106	46
St. Louis	104	+ 6	95	87
Detroit	106	+ 1.5	106	37
Western	104.5	— 1.5	99.5	21.5
Estimated national rate	103	+ 2.5	102.5	9.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week.

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Oct. 25 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)..	171.92	171.92	171.92	157.62	112.04
Index in cents per lb.	4.657	4.657	4.657	4.270	3.035
ARITHMETICAL PRICE COMPOSITES					
Finished Steel, NT	$106.32	$106.32	$106.32	$95.09	$64.45
No. 2 Fdry, Pig Iron, GT..	52.54	52.54	52.54	49.35	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	48.10	27.50
Malleable Pig Iron, GT ...	53.27	53.27	53.27	49.63	28.79
Steelmaking scrap, GT ...	43.00	44.00	44.00	41.67	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Oct. 25 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.15	3.10
Shapes, Std., Pittsburgh....	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia...	3.918	3.918	3.918	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa. ...	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.90	2.50
Sheets, H.R., Pittsburgh...	3.60–75	3.60–75	3.60–75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh...	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh..	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50-3.75	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-4.50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-4.95	3.15
Wire, Basic, Pittsburgh ...	4.85-5.10	4.85-5.10	4.85-5.10	4.50-4.75	3.05
Nails, Wire, Pittsburgh ...	5.90-6.20	5.90-6.20	5.90-6.20	5.30-5.60	3.75
Tin plate, box, Pittsburgh.	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts.(NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, 7/32-⅜", Pitts....	4.10–30	4.10–30	4.10–30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47–$50	$29.00
Basic Valley	52.00	52.00	52.00	46–49	28.00
Basic, del. Phila.	56.61	56.61	56.61	53.39	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Del. Phila....	57.11	57.11	57.11	53.89	30.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	45.88	24.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	52.58	28.94
Malleable Valley	52.50	52.50	52.50	49.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50-49.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt. Pitts...	$44.00	$45.00	$45.00	$44.00	$20.00
No. 1 Heavy Melt. E. Pa..	42.50	43.50	43.50	41.00	18.75
No. 1 Heavy Melt. Chicago	42.50	43.50	43.50	40.00	18.75
No. 1 Heavy Melt. Valley..	44.00	45.00	45.00	43.75	20.00
No. 1 Heavy Melt. Cleve...	43.00	44.00	44.00	43.25	19.50
No. 1 Heavy Melt. Buffalo	43.00	44.00	44.00	41.50	19.25
Rails, Rerolling, Chicago...	52.50	52.50	52.50	64.50	22.25
No. 1 Cast, Chicago.....	49.00*	49.00*	49.00*	53.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl. ..	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl...	17.50	17.50	17.50	16.50	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	14.375
Zinc, E. St. Louis	19.50	19.50	17.50	17.50	8.25
Lead, St. Louis	18.80	18.80	16.80	15.80	8.10
Tin, New York	103.00	103.00	103.00	119.75	52.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex. ..	42.00	42.00	42.00	32.00	14.50
Nickel, refinery, duty paid.	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N. Y., del.	....	59.18	59.68	....
Newark,del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
AlabamaCity,Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward,Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda,N.Y. W12	52.00	52.50	53.00	....
No.Tonawanda,N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester,N.Y., del.	54.88†	55.38†	55.88†	....
Syracuse,N.Y., del.	55.91†	56.41†	56.91†	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary,Ind. U5	52.00	....	52.50	....
IndianaHarbor,Ind. I-2	52.00	....	52.50	....
So.Chicago,Ill. W14	52.00	52.50	52.50	....
So.Chicago,Ill. Y1	52.00	52.50	52.50	....
So.Chicago,Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon,Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron,O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain,O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie,Pa. I-3	52.00	52.50	52.50	53.00
Everett,Mass. E1	....	57.00	57.50	....
Fontana,Calif. K1	58.00	58.50	....	....
Geneva,Utah G1	52.00	52.50	....	....
Seattle,Tacoma,Wash., del.	....	60.66	....	....
Portland,Oreg., del.	....	60.66	....	....
LosAngeles,SanFrancisco, del. ...	60.16	60.66	....	....
GraniteCity,Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
LoneStar,Tex. L6	48.00	*48.50	48.50	....
Minnequa,Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKees Rocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer,Pa. U5	52.00	....	52.50	53.00
Clairton,Rankin,So.Duquesne,Pa. U5	52.00	....	....	....
McKeesport,Pa. N3	52.00	....	....	53.00
Monessen,Pa. P7	54.00	....	....	....
Sharpsville,Pa. S6	....	....	52.50	53.00
Steelton,Pa. B2	54.00	54.50	55.00	55.50
Swedeland,Pa. A3	56.00	56.50	57.00	57.50
Toledo,O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy,N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard,O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield,O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade. † Preliminary.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson,O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls,N.Y. P15	$88.00
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee,Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton,Pa. B2	60.00
Philadelphia delivered	63.37
Troy,N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Oct. 25, 1951; cents per pound except as otherwise noted. Changes shown in Italics.
Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00
INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 .....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y., B2..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ...56.00
Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 .....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 .....66.00
Geneva,Utah G1 .....66.00
Houston,Tex. S5 .....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14 .66.00
So.Duquesne,Pa. U5 ...66.00
So.SanFrancisco B3 ...85.00
Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O.(29) T7 .....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston,Tex. S5 .....78.00
Ind.Harbor,Ind. Y1 ...70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14..70.00
So.Duquesne,Pa. U5 ...70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ...103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago, Ill. R2 ....82.00
So.Duquesne,Pa. U5 ...82.00

SHEET BARS (NT)
Fontana,Calif. K1 ...$89.00

SKELP
Aliquippa,Pa. J5 .....$3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown, R2, U5 ..3.35

WIRE RODS
Alton, Ill. 4.40
AlabamaCity,Ala. R2 ..4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y.B11 .4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 .....4.20
So.Chicago,Ill. R2 .....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ...4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ..3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah G1 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....6.25
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5,W14..3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90
Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 .....5.55
Munhall,Pa. U5 .....4.35
So.Chicago,Ill. U5 .....4.35
H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2 ..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah G1 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 ....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .....6.00
Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ...3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65
H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ..5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45
BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65
PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ...5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah G1 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ..5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15
PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ...5.05
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....4.75
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ..4.75
FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ...4.75
Harrisburg,Pa. C5 .....5.95
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75
PLATES, Ingot Iron
Ashland,c.l.(15) A10 ...3.95
Ashland,lcl(15) A10 ...4.45
Cleveland,c.l. R2 .....4.30
Warren,O.c.l. R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky. (15) A10 ..3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3...4.15
Fairfield,Ala. T2 .....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah, G1 .....3.70
Harrisburg,Pa. C5 .....6.75
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Minnequa,Colo. C10 ....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14.3.70
SparrowsPoint,Md. B2 ..3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 .....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1.3.70
PLATES, Carbon A.R.
Fontana,Calif. K1 .....5.45
Geneva,Utah G1 .....4.85
PLATES, Wrought Iron
Economy,Pa. B14 .....8.60
BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill. L1 .....4.15
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11.3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
So.Chicago R2,U5,W14 .3.70
So.Duquesne,Pa. U5 ...3.70
So.SanFran.,Cal. B3 ...4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
Youngstown R2, U5 ....3.70
BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 370
Atlanta A11 .....4.25
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ..3.70
Niles, Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85
BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90
BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2,U5,W14..4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30
BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary, Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna,N.Y. B2 ..5.55
Los Angeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 ...5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55
BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12,R2.4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 ....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 ...4.55
Gary,Ind. R2 .....4.55
GreenBay, Wis. F7 ....4.55
Hammond,Ind. L2, M13.4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ...4.55
Monaca, Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 ....4.80
Pittsburgh J5 .....4.55
Putnam,Conn. W18 .....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa. (5) K3 ..5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 ....4.55
BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 ..5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ...5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14.5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40
RAIL STEEL BARS
ChicagoHts.(3,4) C2 ...4.75
ChicagoHts.(3,4) I-2 ...4.75
Franklin,Pa. (3,4) F5 .4.75
FortWorth,Tex(26) T4..4.85
Huntngtn,W.Va.(3) W7.5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda (3,4) B12 ..4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10
BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 ..13.50
Dover,(Wrgt.Iron) U1 12.25
Economy,Pa. (S.R.) B14.9.60
Economy,Pa.(D.R.)B14 11.90
Economy,(Staybolt)B14 12.20
McK.Rks.(Staybolt) L5.14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ...13.00
BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1.3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ..3.70
Los Angeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 ....4.50
Niles,Calif. P1 .....5.05
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.70
Seattle B3 .....4.60
So.Chicago R2,U5,W14 ..3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ..3.70
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70
BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..5.50
Johnstown, ¼-1" B2 ...4.75
LosAngeles B3 .....5.45
Marion,O. P11 .....5.00
Seattle B3, N14 .....5.55
So.SanFrancisco B8 ....5.45
SparrowsPt. ¼-1" B2 ..4.75
Williamsport, Pa. S19 ..5.10
SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ...3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 .....3.60
Cleveland J5, R2 .....3.60
Conshohocken,Pa. A3 ..4.00
Detroit M1 .....4.40
Ecorse,Mich.(8) G5 ....3.80
Fairfield,Ala. T2 .....3.60
Fontana,Calif. K1 .....4.55
Gary,Ind. U5 .....3.60
Geneva,Utah G1 .....3.70
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1..3.60
Irvin,Pa. U5 .....3.60
Lackawanna,N.Y. B2 ..3.60
Munhall,Pa. U5 .....3.60
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 .3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 .....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ....3.60
SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ..4.75
Dover,O. R1 .....5.65
Ind.Harbor,Ind. I-2, ...5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 ....5.40
SHEETS, H.R., (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 ..5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1 5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint (36) B2 5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90
SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1..7.05
IndianaHarbor,Ind. I-2 6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 .6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.35
Cleveland J5, R2 .....4.35
Ecorse,Mich. G5 .....4.55
Fairfield,Ala. T2 .....4.35
Follansbee,W.Va. F4 ...5.35
Fontana,Calif. K1 .....5.30
Gary,Ind. U5 .....4.35
GraniteCity,Ill. G4 .....5.05
Ind.Harbor,Ind. I-2, Y1.4.35
Irvin,Pa. U5 .....4.35
Lackawanna,N.Y. B2 ..4.35
Middletown,O. A10 ....4.35
Pittsburg,Calif. C11 ....5.30
Pittsburgh J5 .....4.35
SparrowsPoint,Md. B2 ..4.35
Steubenville,O. W10 ....4.35
Warren,O. R2 .....4.35
Weirton,W.Va. W6 .....4.35
Youngstown Y1 .....4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2 ..4.80
Ashland,Ky.(8) A10 ....4.80
Canton,O. R2 .....4.80
Dover,O. R1 .....5.50
Fairfield,Ala. T2 .....4.80
Gary,Ind. U5 .....4.80
GraniteCity,Ill. G4 ....5.50
Ind.Harbor,Ind. I-2 ....4.80
Irvin,Pa. U5 .....4.80
Kokomo,Ind.(13) C16 ..5.20
MartinsFerry,O. W10 ...4.80
Niles,O. N12 .....6.00
Pittsburg,Calif. C11 ....5.55
SparrowsPoint,Md. B2 ..4.80
Steubenville,O. W10 ....4.80
Torrance,Calif. C11 .....5.55
Weirton,W.Va. W6 .....4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5 .....7.20
SparrowsPoint(39) B2 ..6.75

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.35
Irvin,Pa. U5 .....5.35
Kokomo,Ind.(13) C16 ..5.75
Niles,O. N12 .....6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10 .....5.05
Middletown,O. A10 .....5.05

SHEETS, Electro Galvanized

Cleveland R2 (28) 5.65
Niles,O. R2 (28) 5.65
Weirton,W. Va. W6 ....5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2 ....5.70

SHEETS, Drum Body

Pittsburg,Calif. C11 ....4.30
Torrance,Calif. C11 ....4.30

SHEETS, Well Casing

Fontana,Calif. K1 .....5.10
Torrance,Calif. C11 ....5.10

BLUED Stock, 29 ga.

Yorkville,O. W10 .....6.80
Follansbee,W.Va.(23)F4 6.85

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5 .....9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2 .....$7.60
Gary,Ind. U5 .....7.50
Irvin,Pa. U5 .....7.50
SparrowsPoint,Md. B2 ..7.60
Yorkville,O. W10 .....7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10 .....$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5 .....$9.50
Yorkville,O. W10 .....9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 5.20
Gary,Ind. U5 .....5.20
Mansfield,O. E6 .....6.05
Middleown,O. A10 .....5.20
Niles,O. N12 .....6.00
Weirton,W.Va. W6 ....5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ....4.65
Cleveland R2 .....4.65
Gary,Ind. U5 .....4.65
GraniteCity,Ill. G4 .....5.35
Ind.Harbor,Ind. I-2 ....4.65
Irvin,Pa. U5 .....4.65
Middletown,O. A10 ....4.65
Youngstown Y1 .....4.65

SHEETS, Culvert No. 16	Cu Alloy	Cu Fe
Ashland,Ky. A10.	5.60	...
Canton,O. R2 ...	5.65	6.10
Fairfield,Ala. T2.	5.60	5.85
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16.	6.25	...
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt, B2..	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10 .....5.85
Fairfield,Ala. T2 .....5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10 ....3.85
Cleveland R2 .....4.20
Ind.Harbor,Ind. I-2 ....3.85
Warren,O. R2 .....4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....4.95
Middletown,O. A10 .....4.85
Warren,O. R2 .....4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ...5.05
Canton,O. R2 .....5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....5.30
Middletown,O. A10 ....5.30

SHEETS, ALUMINIZED

Butler,Pa. A10 .....8.15

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2.	8.55	8.80
Gary,Ind. U5 ...	8.45	8.70
Ind.Har. I-2, Y1.	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11 ..	9.20	9.45
Sp.Pt.,Md. B2 ...	8.55	8.80
Warren,O. R2 ...	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10.	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$6.25
Fairfield,Ala. T2 .....6.35
Gary,Ind. U5 .....6.25
GraniteCity,Ill. G4 .....6.45
Ind.Harbor,Ind. I-2, Y1.6.25
Irvin,Pa. U5 .....6.25
Niles,O. R2 .....6.25
Pittsburg,Calif. C11 ...7.00
SparrowsPoint,Md. B2...6.35
Warren,O. R2 .....6.25
Weirton,W.Va. W6 ....6.25
Yorkville,O. W10 .....6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4 ...5.85
Gary,Ind. U5 .....5.85
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. Y1 ....5.30
Irvin,Pa. U5 .....5.85
Yorkville,O. W10 .....6.15

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15 .5.45
Carnegie,Pa. S18 .....5.85
Fontana,Calif. K1 .....6.70
Gary,Ind. U5 .....5.50
Houston,Tex. S5 .....5.90
KansasCity,Mo. S5 .....6.10
Midland,Pa. C18 .....5.85
NewBritn,Conn.(10) S15.5.45
Sharon,Pa. S3 .....5.85
Youngstown U5 .....5.50

STRIP, Hot-Rolled High-strength Low-Alloy

Bessemer,Ala. T2 .....5.30
Conshohocken,Pa. A3 ..5.55
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.30
Fontana,Calif. K1 .....6.20
Gary,Ind. U5 .....5.30
Ind.Harb.,Ind. I-2 .....5.30
IndianaHarbor,Ind. Y1..5.80
Lackawanna,N.Y. B2 ..4.95
LosAngeles(25) B3 .....6.05
Seattle B3 .....6.30
Sharon,Pa. S3 .....5.40
So.SanFrancisco(25) B3.6.05
SparrowsPoint,Md. B2 ..4.95
Warren,O. R2 .....5.30
Weirton,W.Va. W6 .....5.75
Youngstown Y1 .....5.80
Youngstown U5 .....5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5 .....6.70
Cleveland A7 .....6.55
Dover,O. G6 .....7.30
Fontana,Calif .K1 .....6.95
Lackawanna,N.Y. B2 ..6.40
Sharon,Pa. S3 .....6.55
SparrowsPoint,Md. B2 ..6.40
Warren,O. R2 .....6.55
Weirton,W.Va. W6 .....7.20
Youngstown Y1 .....7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...3.50
Alton,Ill. L1 .....3.95
Ashland,Ky.(8) A10 ....3.50
Atlanta A11 .....4.05
Bessemer,Ala. T2 .....3.50
Bridgeprt,Conn.(10) S15.4.00
Buffalo(27) R2 .....3.50
Butler,Pa. A10 .....3.50
Carnegie,Pa. S18 .....4.00
Conshohocken,Pa. A3 ..3.90
Detroit M1 .....4.40
Ecorse,Mich. G5 .....3.80
Fairfield,Ala. T2 .....3.50
Fontana,Calif. K1 .....4.75
Gary,Ind. U5 .....3.50
Houston,Tex. S5 .....4.90
Ind.Harbor,Ind. I-2, Y1.3.50
Johnstown,Pa.(25) B2 ..3.50
KansasCity,Mo.(9) S5 ..4.10
Lackawanna,N.Y.(32)B2 3.50
LosAngeles B3 .....4.25
Milton,Pa. B6 .....4.00
Minnequa,Colo. C10 ....4.55
NewBritain(10) S15 ....4.00
No.Tonawanda,N.Y. B11.3.50
Pittsburg,Calif. C11 ....4.25
Riverdale,Ill. A1 .....3.50
SanFrancisco S7 .....4.85
Seattle B3, N14 .....4.50
Sharon,Pa. S3 .....4.00
So.Chicago,Ill. W14 ....3.50
So.SanFrancisco B3 ....4.25
SparrowsPoint,Md. B2 ..3.50
Torrance,Calif. C11 ....4.25
Warren,O. R2 .....3.50
Weirton,W.Va. W6 ....3.60
WestLeechburg,Pa. A4..3.75
Youngstown U5, Y1 ...3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15 10.75
Carnegie,Pa. S18 .....10.60
Cleveland A7 .....10.00
Dover,O. G6 .....10.50
Fontana,Calif. K1 ....11.65
Harrison,N.J. C18 ....10.60
Midland,Pa. C18 .....10.60
NewBritn,Conn.(10)S15 10.75
Pawtucket,R.I.(11) N8 .10.75
Pawtucket,R.I.(12) N8 .11.05
Sharon,Pa. S3 .....10.60
Worcester,Mass. A7 ...10.30
Youngstown C8 .....10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6 ..5.50
Berea,O. C7 .....6.60
Bridgeprt,Conn.(10) S15.5.35
Butler,Pa. A10 .....4.65
Cleveland A7, J5 .....4.65
Dearborn,Mich. D3 ....5.60
Detroit D2 .....5.60
Detroit M1 .....5.45
Dover,O.(40) G6 .....5.50
Ecorse,Mich. G5 .....4.85
Follansbee,W.Va. F4 ...5.35
Fontana,Calif. K1 .....6.30
FranklinPark,Ill.(40)T6 4.90
Ind.Harbor,Ind. I-2 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles C1 .....6.40
Mattapan,Mass. T6 ....5.50
Middletown,O. A10 .....4.65
NewBritain(10) S15 ....5.35
NewCastle,Pa. B4 .....5.35
NewCastle(40) E5 .....5.25
NewHaven,Conn. D2 ....5.85
NewHaven,Conn. A7 ...5.15
Pawtucket,R.I. R3 ....6.00
Pawtucket,R.I.(21) N8..5.85
Riverdale,Ill.(40) A1 ...4.90
Rome,N.Y. R6 .....5.10
Sharon,Pa. S3 .....5.35
SparrowsPoint,Md. B2 ..4.65
Trenton,N.J. R5 .....6.00
Wallingford,Conn. W2 ..5.85
Warren,O.(40) T5 .....5.25
Warren,O. R2 .....4.65
Weirton,W.Va. W6 ....4.65
Youngstown C8 (40) ...5.25
Youngstown Y1 .....4.65

STRIP, Electro Galvanized

Dover,O. G6 .....5.50
Warren,O. T5 .....5.25
Weirton,W.Va. W6 ....4.65
Youngstown C8 .....5.25

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	....
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	....
Detroit D2	5.60	6.65	7.25	...	....
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6 ..	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	....
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2 ...	5.85	6.75	7.35	...	....
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8: Cleve.orPitts.Base ...	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base .	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2 ..	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths 1/2c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths).	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)....	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower) Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	....	....	....
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	....	....	....
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)

	Stone	Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvlle M8	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass. W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. M8	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. M8	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R3	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.15
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. M8	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala.City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. M8	132
Donora,Pa. A7	130
Duluth,Minn. A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	130

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. M8	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. M8	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)
To dealers (33)

Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.35

NAILS & STAPLES, Stock
To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. M8	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(32) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...	(16)4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

TOOL STEEL

—Grade by Analysis—

Grade	$ per lb	W	Cr	V	Co	Mo	$ per lb
Reg. Carbon	0.230	20.25	4.25	1.6	12.25	..	3.535-3.675
Extra Carbon	0.270	19	4	2	7	..	2.460
Spec. Carbon	0.325	18.25	4.25	1	4.75	..	2.125
Oil Hardening	0.350	18	4	2	9	..	2.445-2.450
5% CrHotWrk	0.350	13.5	4	3	..	..	1.60¼
Hi-Carbon-Cr	0.635	6.4	4.5	1.9	..	5	0.96-0.965
18W,4Cr,1V	1.505	6	4	3	..	6	1.190
18W,4Cr,2V	1.650	1.5	4	1	..	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

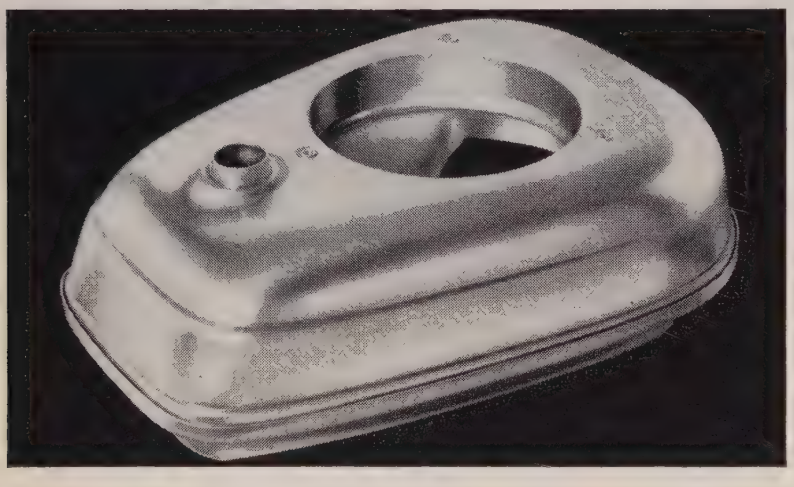
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

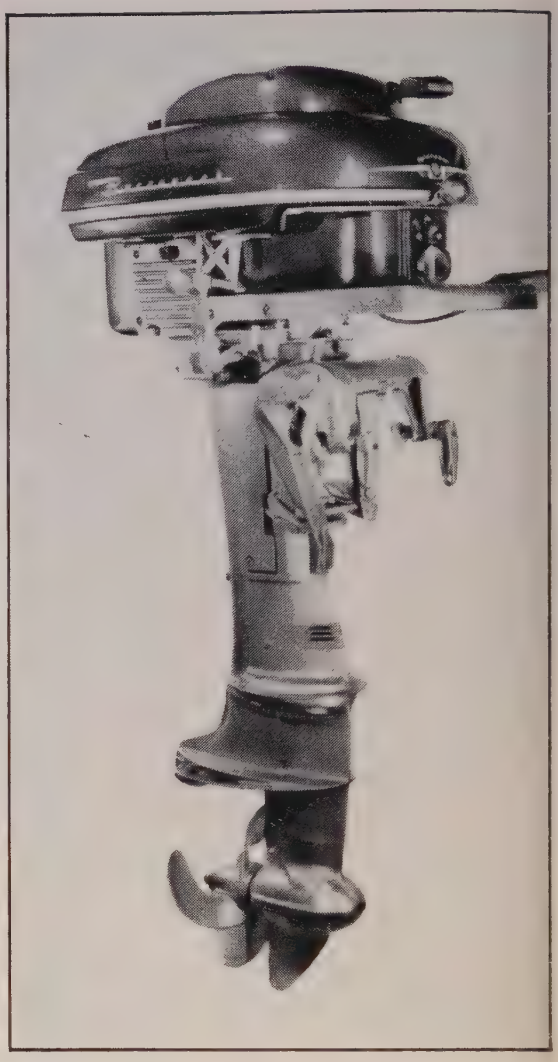
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Gale Products gas tank being assembled for furnace brazing.





IMPROVE YOUR PRODUCT, CUT TIME-COSTS WITH ALUMINUM!

Gas tanks on Buccaneer outboard motors manufactured by Gale Products of Galesburg, Illinois, are not only lighter, handsomer, more durable—*they are easier, less costly to build,* thanks to aluminum!

These all-aluminum tanks are about *one-third lighter than steel*—with the strength for rugged, outdoor use!

They are more durable, for aluminum is more *corrosion-resistant than steel*—a "natural" where petroleum products are used!

Aluminum tanks cost less to fabricate because aluminum is *more formable*—inexpensive to handle compared to steel!

By employing a *mass brazing technique* not feasible with steel, Gale eliminates expensive hand welding methods, lowers finishing costs. And brazing gives a more attractive appearance at the joints.

Let a Kaiser Aluminum engineer help you determine if aluminum is the answer to *your* design or production problems. No obligation or cost for his services. Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, California. 65 sales offices and warehouse distributors in principal cities.

Kaiser Aluminum

Setting the pace—through quality and service

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill., 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.98	31.76
2½	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Strip—Cold-Rolled Carbon Base 10%	Strip—Cold-Rolled Carbon Base Both Sides	Sheets—Carbon Base 10%	Sheets—Carbon Base 20%	Sheets—Cu Base Both Sides
302	....	....	....	....	19.75	26.24–27.50	77.00
304	25.00	29.50	....	....	24.50	27.50–27.77	77.00
309	30.50	35.00	....	....	....	....	....
310	36.50	41.00	....	....	....	....	144.00
316	29.50	34.00	....	....	26.00	35.92–36.50	....
317	34.50	39.00	....	....	....	....	....
318	33.50	38.00	....	....	....	....	....
321	26.50	31.00–32.00	....	....	23.00	33.00	111.00
347	27.50	32.00	....	....	24.00	33.50–33.83	130.00
405	21.25	27.75	....	....	....	....	....
410	20.75	27.25	....	....	....	....	....
Nickel	33.55	45.15	41.00	54.00	....	....	....
Inconel	41.23	54.18	....	....	....	....	165.00
Monel	34.93	46.28	....	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....	....

* Deoxidized, † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 15
- ⅝-in. & ⅝-in. 18.5
- ¾-in. and larger 17.5

Longer than 6 in.:
- All diams. 14

Lag bolts, all diams.:
- 6 in. and shorter 23
- over 6 in. long 21

Ribbed Necked Carriage 18.5
Blank 34
Plow 34
Step, Elevator, Tap, and Sleigh Shoe 21
Tire bolts 12
Boiler & Fitting-Up bolts 31

NUTS

	Reg.	Hvy.
H.P. & C.P. Square:		
½-in. & smaller	15	15
⅝-in. & ⅝-in.	12	6.5
¾-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	16.5	6.5
¾-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅝-in.	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅝-in.	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
7/16-in. & smaller		35
½-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 48 & 10
Plated finishes .... 31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ⅝-in. & smaller 42
- ¾-in. through 1 in. .. 34

Longer than 6 in.:
- ⅝-in. & smaller 26
- ¾-in. through 1 in. .. 4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 38
1 in. and smaller diam. x over 6 in. 26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 35
¼-in. diam. & larger .. 16
N.F. thread, all diams. . 10

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.85c
7/16-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
	CARBON	
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bolt., Types 301-347 sheet, quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, except 303 and 309 E2.

Brackenridge, Pa., sheets A4 sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes slight variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 30.00-35.00
Toluol, one deg...26.00-33.00
Industrial xylol .25.00-33.50
Per ton bulk, ovens
Sulphate of ammonia..$32-$45
Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron Cents
- 98+% Fe, carlots.. 17.00
- Swedish, c.i.f. New York, in bags .8.85-9.95

Electrolytic Iron:
- Annealed, 99.5% Fe. 42.50
- Unannealed, 99 + % Fe 36.50
- Unannealed, 99 + % Fe (minus 325 mesh) 58.50

Powder Flakes 48.50
Carbonyl Iron:
- 97.9-99.8%, size 5 to 10 microns ..83.00-148.00

Aluminum:
- Carlots, freight allowed 29.50
- Atomized, 500 lb drums, freight allowed 33.50

Antimony 75.85
Brass, 10-ton lots.30.00-33.25
Bronze, 10-ton lots 51.25-60.00
Phosphor-Copper, 10 ton lots 50.00
Copper:
- Electrolytic 37.25-46.25
- Reduced 33.75-37.00

Lead 25.50
Magnesium 75.00-85.00
Manganese:
- Minus 100-mesh 57.00
- Minus 35 mesh 52.00
- Minus 200 mesh 62.00

Nickel unannealed .., 86.00
Nickel-Silver, 10-ton lots 45.00
Silicon 38.50
Solder (plus cost of .. metal) 8.50
Stainless Steel, 302 .. 83.00
Zinc, 10-ton lots..23.00-30.50

Tungsten Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:
- 1000 lb and over .. 6.00
- Less than 1000 lb .. 6.15

98.8% minus 65 mesh, freight allowed:
- 1000 lb and over ... 4.15
- Less than 1000 lb .. 4.25

Molybdenum:
- 99.9%, minus 200 mesh 3.25

Chromium, electrolytic
- 99% Cr min. 3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll,fur. .$14.50-15.00
Connellsvll,fdry. .17.00-18.00
New River foundry ...21.30
Wise county, foundry ..15.95
Wise county, furnace ..15.20

OVEN FOUNDRY COKE

Kearny, N. J., ovens..$22.75
Everett, Mass., ovens
- New England, del...*24.80

Chicago ovens 23.00
- Chicago, del. 24.50

Terre Haute, ovens ...22.50
Milwaukee, ovens 23.75
Indianapolis, ovens 22.75
- Chicago, del. 26.42
- Cincinnati, del. 25.85
- Detroit, del. 26.85

Ironton, O., ovens 22.50
- Cincinnati, del. 25.12

Painesville, O., ovens..24.00
- Cleveland, del. 25.82

Erie, Pa., ovens 23.50
Birmingham, ovens 20.30
- Birmingham, del. 21.60

Philadelphia, ovens ...22.70
NevilleIsland,Pa.,ovens 23.00
Swedeland, Pa., ovens..22.60
St. Louis, ovens
- St. Louis, del. 25.40

Portsmouth, O., oven..22.50
- Cincinnati, del. 25.12

Detroit, ovens 24.00
- Detroit, del. 25.00
- Buffalo, del. 26.80
- Flint, del. 26.59
- Pontiac, del. 25.47
- Saginaw, del. 26.92

* Or within $4.15 freight zone from works.

These are the special purpose steels that set Crucible apart from most other steel companies. For these special steels must be so carefully compounded, and so sensitively handled that, in most cases, they cannot be mass produced.

Such steels include those designed for use under severe conditions of heat or cold, stress, strain, or wear. For example: Crucible high-speed tool steels are in the whirring machines that cut and shape the toughest metals; Crucible hollow drill steels work around-the-clock digging mines and quarries, and Crucible stainless steels put a sparkle with a purpose in our kitchens.

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National Drawn Works, East Liverpool, Ohio • Sanderson-Halcomb Works, Syracuse, N. Y. • Trent Tube Company, East Troy, Wisconsin

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3 colors, 9" diameter

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TOOL STEELS

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WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city) ..	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)..	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city) ...	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try) ..	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city) ...	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try) ..	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va. ..	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va..	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse) .	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.) ..	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††[5]	6.00	6.25	7.55
Buffalo (w'hse).	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††[5]	5.80	6.05	7.35
Pitts. (w'hse) .	5.60	6.40•	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse).	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.82
Cleve. (w'hse) .	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city) ..	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city) .	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse) .	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city).	5.75	6.55	6.90[2]	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75[2]	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05[3]	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse) .	6.35	7.90	8.85[3]	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco..	6.65	7.80[4]	8.90[3]	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma.	7.05	8.60[3]	9.20[3]	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—3500 lb and over; [5]—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports. After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%: Spot	17.00
Long-term contract	15.00
North African hematites	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156 20.

High-Heat Duty: Salina, Pa., $99.60, Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

Magnesite

Per net ton, Chewelah, Wash. Domestic deadburned, ⅝" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Narlo, Clay Center, Woodville, Gibsonburg, Bettsville, O., Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: For current quotations on manganese, titanium and "other" ferroalloys, see page 149, Oct. 15 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 135, Oct. 22 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Oct. 25	$43.00
Oct. 18	44.00
Sept. 1951	44.00
Oct. 1950	41.37
Oct. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and easter Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1	No. 1 Bundles Dealer, Industrial	No. 1 H.Melt. Railroad
Basing Point		
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Hard Steel cut 2 ft & under	+ 5.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices establishd for Grades 12 and 8, respectively.
(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.
(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries.
(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.
(6) Prices for Grade 30 may be charged only when sold to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.
(4) Deduction of not less than $1.50 per ton from ceiling prices is required where purchaser is required to load scrap on a transporting vehicle or f.a.s. vessel.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches.	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.
(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery.	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18 or No. 20, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6. For preparing into:
(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, 70c.
Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory:	
Prep'd.	33.00
Unprep'd.	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast.	58.00-60.00

* F.o.b. shipping point.

The Metal Market

Advance in lead and zinc scrap prices will revive secondary industry and augment supplies for defense effort. Other programs are being developed on long-term basis

LEAD AND ZINC resources of the United States are being mobilized as rapidly as possible to meet increasingly heavy demands under the defense program. Upward revision in lead and zinc scrap prices will stimulate activity immediately in the secondary industry; other programs will not reach their goals until 1952 or later.

An additional 20,000 tons of slab zinc for stockpiling and other defense purposes is assured under an agreement reached by Defense Materials Procurement Agency with National Zinc Co. Inc., New York. The zinc will be produced from rich zinc deposits located near Monterrey, Mexico.

The agreement calls for construction of a $450,000 concentrating plant at Monterrey, scheduled to be completed within a year. The ore beneficiated there will be shipped to the company's smelter at Bartlesville, Okla., where it will be refined into slab zinc. DMPA has agreed to buy a monthly average of 600 net tons of this production at 16.50c a pound, f.o.b East St. Louis, providing the company cannot sell it to industrial users at a higher price.

Government's agreement will end when the new facilities have produced 20,000 tons of slab zinc, or on Aug. 15, whichever first occurs.

Mines Dewatered—Crews driving the Leadville, Colo., drainage tunnel have reached one of their major objectives, the Robert Emmet shaft. As miles of old mine workings slowly drain, Leadville's still substantial ore reserves gradually are being exposed. Congress recently appropriated an additional $425,000 to complete the tunnel. Mine owners will pay a royalty to the government on each ton of ore made available, produced and sold as a result of the drainage project.

Effective Oct. 22, OPS advanced ceiling prices for zinc scrap, remelt zinc, lead scrap, secondary lead and antimonial lead. The increases were made to bring these prices in line with ceilings for primary metals which were raised 2 cents a pound Oct. 2.

Ceilings on most types of lead scrap were raised 2 cents. However, ceilings on drained used storage batteries were raised 1.05 cents a pound. A flat price ceiling of $2.80 a battery was placed on used passenger automobile batteries when sold "as is." The ceilings on batteries do not apply when a dealer is making an allowance for an old battery when sell a new one, or when he is making a refund on a guarantee.

A 2 cents a pound increase was made in the ceiling applying to remelt zinc with at least 97.5 per cent zinc content when sold in lots of 10,000 pounds or more. The increase amounts to only 1.75 cents a pound when the zinc content is less than 97.5 per cent. Ceilings applying to unsweated zinc dross and zinc die-cast slabs were increased by 1.50 cents a pound to a new level of 13.75c a pound. Other grades of zinc scrap were increased by 1 cent.

Enactment of legislation to suspend import duties on lead and zinc was blocked in the Senate, forcing postponement of further consideration until next year.

Metal Product Prices Rise

Advance of 2 cents a pound was authorized by OPS on lead and zinc products on the basis of a recent like advance in the primary metals. New prices are effective as of Oct. 24.

A supplemental regulation also permits galvanizers who perform services for others to increase prices by 2 cents a pound for zinc deposited on material or product galvanized.

Foundries Need Aluminum

National Production Authority plans to take emergency action soon to provide aluminum bar, rod and ingot to meet pressing needs of castings makers who have contracts to produce aircraft and engine parts. Aluminum ingot will be diverted from sheet mills to the production of rod and bar.

The government has requested the industry to reduce aluminum sheet production in the first quarter of 1952 to a rate of 30 million pounds under the present quarterly production rate of 220 million pounds. Under this plan, the industry would increase aluminum rod production by 20 million pounds per quarter and aluminum ingot production by 10 million pounds.

Several producers or prime aluminum are being asked to limit their use of segregated scrap temporarily in order to permit an increased use of the material by smelters and foundries.

Ingot Makers Get Scrap

Government is releasing to brass and bronze ingot manufacturers material for the production of manganese bronze, silicon bronze, aluminum bronze and all high grades of ingot. The industry's advisory commmittee had informed NPA previously that serious curtailment of production is anticipated in many segments of industry unless a prompt solution is found to the increasingly grave shortage of red metal scrap.

NPA is amending order M-16 by changing the inventory restriction from a 60 to a 30-day inventory of scrap. A nonferrous scrap recovery campaign is being planned.

A new direction to order M-16 is being prepared. Under this direction, foundries, brass mills and ingot makers will be authorized to obtain advance allotments of materials equal to 50 per cent of the quantity received during the preceeding month.

All grades of manganese bronze ingot advanced 1 cent a pound, effective Oct. 22.

FROM POTS TO ROCKETS: Two stamping machines perform a major operation on Revere Ware pots at the Rome Mfg. Co. Division of Revere Copper and Brass Inc., Rome, N. Y. Revere has plans for the early manufacture of rockets at the Rome Division and production of steel shells at its Clinton, Ill., plant. Defense work is presently accounting for almost 25 per cent of Revere's production

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $220-$222 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18%, 53.14; phosphor-bronze grade A, 5%, 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95%, 41.30; 90% 40.82; red brass 85%, 39.83; 80%, 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90%, 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95%, 41.90; 90%, 41.42; red brass, 85%, 40.43; 80%, 39.96; best quality brass, 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10, 100-000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 80%.

ZINC

Sheets, 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 24.50-26.50c; over 12-in., 24.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.625
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 83 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 78 cents per lb of tin content; unlined red car boxes 19.25; lined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50, high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Oct. 5-25	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Oct. 4	24.50	18.80	19.50	103.00	19.00	42.00	56.50	84.75
Oct. 2-3	24.50	18.80	19.50	103.00	19.00	42.00	56.50	90.16
Oct. 1	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Sheets, Strip . . .

Sheet and Strip Prices, Page 105 & 106

Boston—A substantial volume of galvanized sheet inquiry is being turned down for delivery in first quarter. Zinc allocations have been reduced drastically. Most galvanizers have reduced thickness of coatings to minimum limits. First-quarter allotments of carbon sheets also are smaller. Some users are asking for supplemental aid; when granted, they find mills already are booked solidly. Lack of tickets to cover unshipped third-quarter volume has resulted in more cancellations than had been estimated earlier.

New York—Sheet sellers anticipate a flurry this week, as the 15-day period opens in which consumers may apply for tonnage for January on a first-come-first-served basis. As producers have to set aside only 10 per cent of their capacity for coverage of such demand, requests likely will far exceed available tonnage. Actually, this probably will involve much extra paper work because there is no way of cutting off the flow of orders until mills have established sequence of the orders. One large producer claims he might require two weeks to establish the sequence, or until after enough tonnage has come in far more than to absorb the set-aside.

Philadelphia—Some sheet sellers are beginning to book conservatively into second quarter on other than high rated priority tonnage. Certain other sellers say they will probably take such action soon. Meanwhile, shortage of zinc has caused some producers of coated products to cut back as much as 40 per cent on their acceptances for January. Straight chromes are being increasingly hobbled by shortage of ferrochrome. Some mills, however, can still make fairly early delivery, especially in strip.

Pittsburgh—Supply conditions in the light, flat-rolled steel products will be just as tight in first quarter as at present. However, the sheetmakers think better balance will be achieved between supply and demand, at least so far as Controlled Materials Plan tickets are concerned. So far the mills are in receipt of few cancellations of fourth quarter tonnage as result of the recent ruling of NPA that third quarter tonnage shipped after Oct. 7 be charged against fourth quarter allotments. Consequently, few openings have developed in mill schedules to permit acceptance of unplaced CMP tickets for the period.

Cleveland—Sheetmakers anticipate no easing in the market before second quarter at earliest with military and other defense demands not yet at peak. Currently, only a relatively small proportion of total flat-rolled tonnage being shipped is on direct military account. However, related defense needs are increasingly heavier. Cutbacks in civilian durable goods have eased supply conditions to some extent but overall shortage continues. Producers are booking through first quarter, and as a general thing, are limiting acceptances beyond to high-rated military orders. Some trade interests think easier supply will be experienced along toward mid-1952 by which time considerable new roll-

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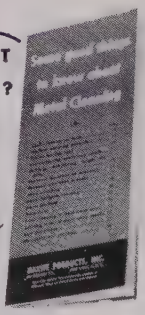
See page 9



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ing capacity is scheduled to come into operation.

Cincinnati—Extent of priority sheet tonnage for first quarter delivery points to continuation of tight supply conditions. Cutbacks in civilian requirements in the current quarter are not vividly reflected on mill orders due to reduced allotments enforced by defense demands. Cancellations are having only a minor effect on mill schedules.

Birmingham — Mills say there is little change in the overall picture in light flat-rolled products and that the problem is complicated by distribution angles due to government regulations.

Semifinished Steel . . .

Semifinished Prices, Page 105

Pittsburgh—Steel ingot production in this district is being pushed to the limit of available facilities. The district ingot rate last week went up ½ pont to 101 per cent of capacity. Additional openhearth capacity is about ready to be placed in operation here. First heat from the new 11-furnace shop of Jones & Laughlin Steel Corp. will be tapped Oct. 30. These new openhearths will boost J. & L.'s steel capacity at the Pittsburgh works to about 3,337,500 tons annually.

Steel Bars . . .

Bar Prices, Page 105

Pittsburgh—Barmakers are under increasing pressure for supplies as requirements on military account increase. Much of the present stringency stems from the fact that bar mill facilities have not been enlarged in recent years to the same extent as other steelmaking equipment. Consequently, expanded demand must be satisfied from producing capacity that simply is not equal to the task. Most bar mills, including cold-drawers, predict just as acute stringency in first quarter next year as is being experienced at present. Most sellers believe, however, better balance between supply and CMP allotments will be achieved in the period.

New York—Hot carbon bar producers report increasing stringency in the larger sizes. Shell steel requirements account for much of the demand on sizes 3 inches and over. Producers are not accepting tonnage beyond March except orders carrying high priorities.

Philadelphia—Most hot carbon bar sellers anticipate such a heavy carryover at the end of this quarter that they are limiting acceptance of new business until they have a better view as to where they stand. Sellers of cold drawn bars are accepting tonnage for second quarter and within the past week one producer opened books for that period on hot alloy bars.

Chicago — Barmakers report relatively few cancellations of orders to enable them to accommodate CMP tickets which many consumers have been unable to cash. Expiration of mill lead times for December operate against schedule alterations for this quarter. It appears that users who lost tonnage from third quarter carryover not shipped by Oct. 7 are seeking to get CMP reinstatement under hardship pleas rather than cancel. Cold finished bar suppliers likewise indicate few cancellations and much customer pressure for material.

Cleveland—Bar producers anticipate no change in tight supply conditions for months to come. Pressure for tonnage, if anything, is heavier as military and related defense requirements mount. Peak of defense demand still is months distant. Expectations are there will be heavy carryover tonnage into first quarter next year and sellers consequently are booking forward business cautiously.

Seattle—Bar mills are rolling steadily, attempting to reduce heavy backlogs. Bookings run well into 1952 and prospects are favorable for next year in view of continued active construction in Alaska. Small tonnages are accepted only when they fit into current schedules.

Structural Shapes . . .

Structural Shape Prices, Page 105

Boston — Volume of fabricated structural steel being estimated is smaller; not until bridges to be readvertised for bids are out is a spurt in inquiry expected. Bulk of industrial expansions in connection with defense are under contract. Both fabricating shop and erecting schedules are hampered by shortage and uneven flow of plain material. Completion of considerable work, notably bridges, will be extended beyond original dates.

Philadelphia—Little new structural inquiry is reported, apart from bridge work. Contracts are spotty. Some industrial and government work has been pending for some time and should be placed shortly. Meanwhile, fabricating shops are operating at a good rate against back orders and, provided they can obtain sufficient plain materials, including plates and bars and shapes, they should be able to sustain operations for several months.

Pittsburgh—Pending tapering off in the large defense construction program there is little chance for any substantial easing in structural steel supplies, in the opinion of the trade here. Not only is a large tonnage of heavy steel items required for building programs, but these latter in turn are giving rise to unusually large requirements for heavy structural members for machinery and plant equipment. Some of the shortage in structurals, it is said, stems from unrealistic allocation by NPA. At least the shortage would not be as acute as it is, trade authorities say, if tonnage were allotted in step with needs. Certainly, they say, if allotments were attuned more closely to actual building or program starts, supply conditions would be substantially relieved.

Seattle—Demand for shapes, chiefly for public works, is increasing. Plants are heavily booked and are selective in bidding. Scarcity of materials is more acute. Fabricators complain that current allocations are unfair to industrial, agriculture and chemical plants. Suspicion is increasing that some steel is being diverted into speculative channels. One large fabricator reports some capacity available, but is unused because steel is not available.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 105

Los Angeles — Valuation of engineering construction in southern California, southern Nevada and Arizona in September reached an all-time high for that month—$16,639,592, 39.8 per cent higher than in September last year.

Plates . . .

Plate Prices, Page 105

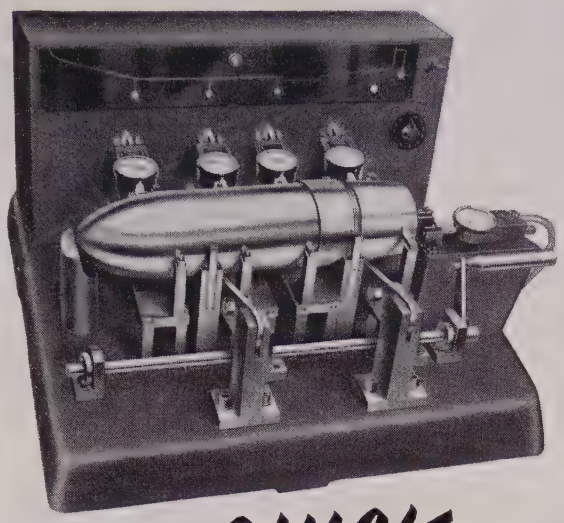
New York—Plate consumers stand a chance of getting in a little tonnage for January shipment now that the 15-day period is near at hand when they are permitted to place business for that month on a first-come-first-served basis. As mills are only required to set aside 10 per cent of their capacity for acceptance of such tonnage, the individual buyer stands a chance of obtaining only a limited tonnage at best; unless he acts quickly, none at all. This 15-day period precedes the 45-day lead time each month. This is the first time that the regulation governing this procedure becomes effective.

Boston—Reduced steel allocations for first quarter, notably plates, have halted work on one Mariner class cargo ship at the Quincy, Mass., yard; work on 14 ships in this class at six yards has been suspended. For first quarter, Maritime Administration asked for 183,000 tons and got 100,000 authorized. This cut in plate allotments is typical with most plate shops and schedules are being revised more in line with supply to be available. High on priority lists are undergronud tanks for air fields, but tank work in other directions is confronted with curtailment.

Philadelphia—At least one large plate seller is beginning to accept CMP orders for second quarter, although conservatively. These orders are in addition to those carrying special military ratings. Certain other mills indicate they will take similar action shortly. Meanwhile they are receiving some additional tonnage for first quarter from customers who have now been advised by Washington that the full extent of their allocations for that period will exceed the percentage of fourth quarter allotments which consumers were permitted to place originally and what the definite amount will be. On the other hand, there have been some cutbacks, notably as a result of curtailments in the railroad equipment and shipbuilding programs.

Pittsburgh—So far no openings of appreciable size have appeared in fourth quarter plate schedules to care for unplaced CMP tickets for the period. Few cancellations have been received by the mills as result of NPA's order that unfilled third quarter shipments after Oct. 7 be charged by consumers against their fourth quarter allotments. At best, no openings in schedules are likely to develop before the closing month of the period. By that time some cancellations may come through. Also some program cutbacks, such as in shipbuilding, may release a little committed tonnage.

Birmingham—Plates remain tight and there is nothing to indicate any



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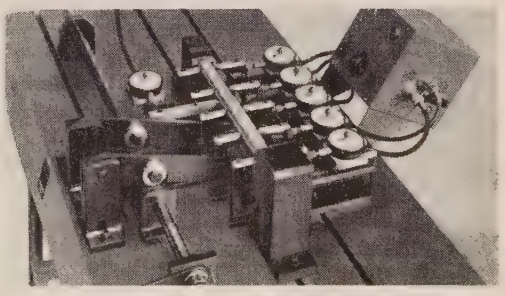
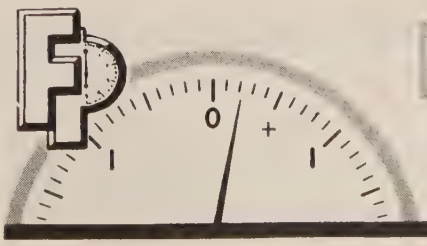


This Electricator Gage is adjustable for workpieces of various diameters and lengths. Notice a single monitor light signals when any dimension is "off".



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change so long as carbuilding requirements are heavy along with considerable shipbuilding and repair work.

Los Angeles—With government directives absorbing large blocks of plate tonnage scheduled for nearby delivery, that product is the tightest of all steel products on western steelmakers' order books.

Seattle—Considerable plate tonnage is involved in fuel storage facilities at Army bases in Washington, Montana and Alaska. Bids for a large project at Kenai, Alaska, have been rejected and will be rebid in the first quarter. Materials are increasingly tight and small shops are in difficulties.

Tin Plate . . .

Tin Plate Prices, Page 106

Pittsburgh—Continued tight tin plate supply through March is indicated. While 1 million tons per quarter were set up tentatively for the canmakers for the 12 months beginning Oct. 1, there is considerable uncertainty as to just what tonnage actually will be available. Firm commitments remain to be made for the period by the mills though orders are being entered on books. Some of the confusion in the market attending NPA's recent ruling that carryover tonnage from third quarter unshipped by Oct. 7 be charged against fourth-quarter allotments has been removed. Tin plate not shipped by the terminal date is considered as shipped where it has been customary for the mills to produce and hold tonnage in inventory for later release to consumers. This practice is widespread in the industry. Consequently, relatively little third-quarter tonnage will have to be charged against fourth quarter allotments.

Tubular Goods . . .

Tubular Goods Prices, Page 109

Boston—With December allotments of merchant steel pipe to distributors about 17 per cent heavier, direct shipments for first quarter will be reduced. This leaves less tonnage for utilities at a time when more are asking for pipe in connection with natural gas tie-in lines. Even so, close to 1200 tons have been found for gas utilities at Brockton, Mass., and Hartford, Conn. Supply of seamless pipe, ranging from 2 to 10 inches, is especially tight with normal stock buyers asking for heavier direct shipments.

Wire . . .

Wire Prices, Page 107

Birmingham — Wire jobbers are particularly hard up and are doling out available supplies on the most equitable basis possible. Demand includes all specifications from manufacturers wire to nails.

Warehouse . . .

Warehouse Prices, Page 111

Philadelphia — While distributors can now accept non-rated orders where they have tonnage to spare beyond CMP requirements, it appears, they say, that this open-end will soon be closed. As a matter of fact, they have had little tonnage to spare beyond rated work for some time. Business in the month now closing is expected to be about on a parity with the preceding month, on the basis of daily average.

Pittsburgh—Unbalanced stocks prevent the warehouses from meeting all the demands coming to them. Receipts from the mills have been disappointing, especially in bars and structurals. However, tonnage has been coming in steadily and expectations are distributors' stocks will increase in first quarter when the warehouses are scheduled to get 100 per cent of their base period receipts. Currently, interest in the market centers in a hearing into gray market operations to be held here by a Senate subcommittee headed by Sen. Blair Moody of Michigan. Effort is being made to learn the source of high-priced steel offered fabricators. Steel sellers here say gray market operations in this district are limited, and are largely confined to sale of imported material.

Cleveland—Some warehouse operators report demand slightly less pressing than some time back, reflecting slackening of activities in civilian durable goods manufacture. Overall pressure for tonnage, however, continues in excess of distributors' ability to satisfy with stocks unbalanced. Increase in mill receipts is expected

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next quarter when the warehouses are scheduled to receive 100 per cent of their base period tonnage receipts. Reports are circulating in the market to the effect the National Production Authority is considering a regulation which would place warehouse business under the Controlled Materials Plan.

Cincinnati—Warehouses are finding no pickup in steel tonnage from mills. Demand is sustained, so that shipments are distributed quickly, leaving stocks far below usual levels and badly out of balance. All items are in short supply.

Biirmingham — Warehouse inventories are shrinking. Distributors believe improvement will be experienced after the first of the year when 100 per cent base period receipts are scheduled.

Los Angeles—Lag in aircraft production, coupled with plane-makers' custom of furnishing material to their smaller subcontractors on time contract basis, has reduced demand for steel from aircraft interests.

Seattle—Warehouses report allocations are slow and inadequate to make stock replacements. All items are scarce. Demand continues despite seasonal decline in outside construction.

Pig Iron . . .

Pig Iron Prices, Page 104

New York—Pig iron demand still exceeds supply. Pressure is easier in some instances where foundries are experiencing a decline in their casting business, but even in these cases many would like to accumulate larger pig iron inventories. Few have the 30-day supply on hand that is permitted by government regulations.

Philadelphia—While pig iron is in short supply, foundry coke appears ample for at least the nearby future. Furnace coke is in stronger demand than foundry grades. Operations at the sanitary ware plants remain sluggish and jobbers specializing in small gray iron castings report business spotty. Nevertheless, most would like to have more pig iron.

Pittsburgh—Merchant iron sellers have no difficulty disposing of their output, but there is a definitely easier tone prevailing in the market. Pressure for deliveries from the foundries has eased, reflecting curtailment in civilian durable goods production. Plumbing and heating foundries are slower, but the regular jobbing foundries are loaded to capacity with orders related to the defense program. Some of them are on machine tool castings. Requests for tonnage are coming to iron sellers from outside the area, but even such inquiry is less pressing because some foundries are carrying inventories to the limit allowed under NPA regulations.

Cleveland—Pressure on the merchant pig iron sellers is off somewhat with the foundries less active. Overall supply conditions, however, remain just about as tight as ever with two blast furnaces in this immediate district idle for repairs. Expectations are both stacks will be restored to blast next month. Meanwhile, operations in foundries producing light castings are down, reflecting cutbacks in civilian durable goods. Shops on heavy castings, however, are busy, but they are having difficulty getting sufficient labor, especially molders, to enlarge their schedules.

Cincinnati—Spotty conditions exist in district foundries, those most active being on machine tool castings. Shortage of pig iron is, in general, not felt so acutely and in some cases the proportion of scrap in the melt is being reduced. Despite higher delivevered prices, Texas and Canadian iron is augmenting the supply from normal sources.

Chicago—Inventory regulations are prompting a few gray iron foundries whose melting operations are off from reduced demand for castings to defer shipments of pig iron. Such cases are not too numerous and suppliers have no difficulty in finding ready takers for the iron. Pressure still remains less intense than recently. The limited amounts of foreign iron available are not being snapped up readily because of high prices. Delivered in this area, such iron runs from $90 to $100 a ton.

Birmingham—Merchant iron production is being handled on the same basis in effect here for months which means melters are supplying regular customers so far as possible and are, of necessity, turning down many inquiries.

San Francisco—Pig iron inventory at the steel mill level is at a low

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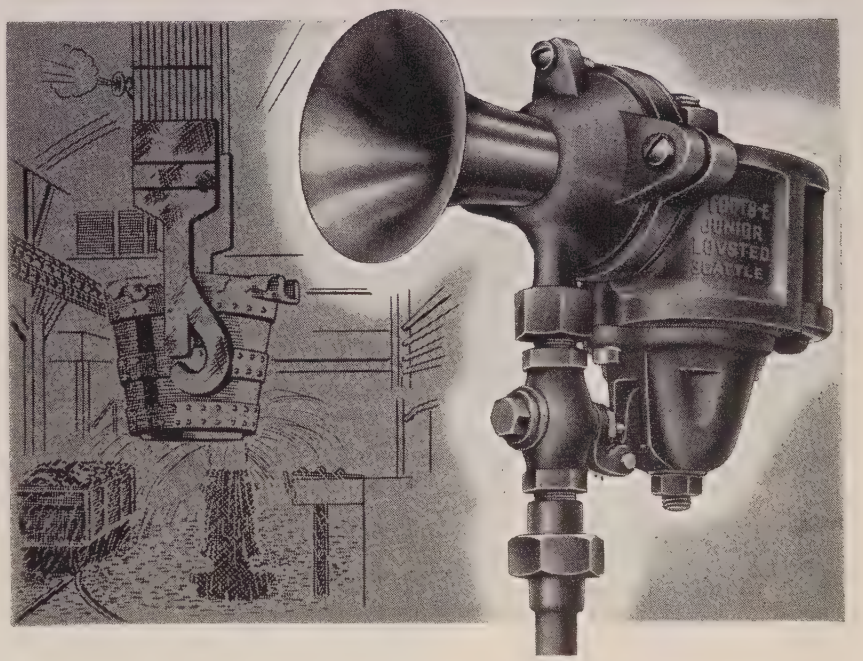

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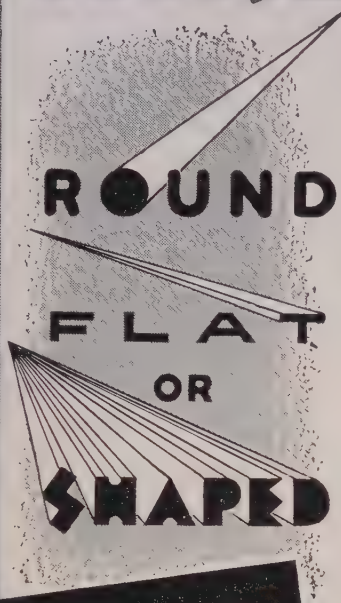

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state. Some small shipments are received from the Midwest, but imports are extremely slow.

Hamilton, Ont.—First pig iron to be shipped by water from Dominion Foundries & Steel Ltd., this city, was loaded aboard a lakes freighter which will carry the cargo to Chicago.

Scrap . . .

Scrap Prices, Page 112

Detroit—Common reaction to last week's amendment to CPR 5 locally was that after the steel industry and scrap industry had made recommendations, OPS went ahead and disregarded many of the suggested changes and worked out an order which may have almost as many shortcomings as the previous one. Reduction in the premium on 2-ft and shorter foundry steel will discourage cutting and make longer lengths available to steel mills, undoubtedly an aim of this revision, but possibly of only temporary value.

Traders agree some speed-up in shipments may result from the order because segregation of certain grades will not be practiced. Where prices have been increased as in No. 2 bundles, some improvement in supply may result. However, dealers here express more concern over the effect of the ceilings on preparation charges.

Local scrap supply is falling in spite of all efforts by the scrap drive, and the picture is not expected to change materially because of this new order. One of the largest automotive scrap generators has warned brokers its next scrap list will contain only about half the quantity which has previously been awarded, this because of shutdowns and lower level of operations generally.

Philadelphia—Scrap trade leaders believe that while amendment 5 to CPR 5 may not go far enough, it is nevertheless a step in the right direction. They expect it will check the flow of scrap to points outside the district in substantial degree, a situation that has made for considerable hardship among local mills, and will virtually retard the upgrading of some items where differentials have been narrowed. Revoking of permission for basic open hearth and blast furnace consumers to purchase No. 20 and No. 21 foundry grades is regarded as a healthy measure.

Reactions are mixed as to establishment of ceiling prices for all sales and deliveries involving inter-dealer transactions in unprepared material which previously were exempt from price control. In many instances, it is pointed out, it will mean that the small collector will receive less for the material brought in than previously, thus retarding the flow of dealer scrap.

Pittsburgh—Steel mills face increasingly serious scrap shortage as inventory accumulations for the winter months fail to gain encouragingly. Some district consumers even now are working on as little as 3-days' stocks. The government-sponsored collection drive is bringing out some material, but the added tonnage doesn't mean much in the way of stocks with district steelmaking operations booming along at capacity pace. Unless inventories are increased in the weeks immediately ahead, sharp curtailment in steel production appears certain this winter. Supplies of cast scrap are adequate with demand from the foundries noticeably less pressing.

Cleveland—Consensus in the scrap trade here is that amendment 5 to price regulation No. 5 will not eliminate upgrading in steelmaking grades. This was one of the main reasons for making a change in the order. Some dealers forecast a sharp rise in the movement of material under the designation of "No. 1 busheling." Base prices for dealer and industrial scrap now apply to No. 1 bundles and No. 1 busheling. Prices are $1 under base now for No. 1 and No. 2 heavy melting and No. 2 bundles. Foundry steel scrap ceilings are advanced $2 a ton, with grade 2 feet and under applying to base and with 1 foot and under taking a $2 premium. Trade interest still show more concern over supplies after the first of the year than they do over prices. An acute shortage in January and February is expected to follow stringency in November and December.

Cincinnati — Scrap is moving to mills in volume to maintain the high rate of melt, but shipments fail to provide any tonnage for reserve stock against winter needs. Ideal weather for collections and preparations has not bolstered the flow of material, leading to belief that some holding for speculation exists. Cast scrap continues comparatively easy.

Washington—Stocks of scrap held by consumers on July 31 totaled 3,748,964 tons, the first increase in six months. Stocks of purchased scrap on the same date amounted to 2,703,282 tons compared with 2,626,308 tons on June 30 and were equivalent to a 32-day supply at the July consumption rate, reports the Bureau of Mines. Scrap used in steelmaking furnaces totaled 4,045,557 tons, with pig iron totaling 4,719,158 tons for a total melt of 8,764,715 tons. This was a decrease of 37,751 tons in melt from the June melt.

Chicago—Revisions in scrap price ceilings which makes No. 1 bundles the new base and levels off No. 1 and No. 2 heavy melting steel and No. 2 bundles at $1 per ton less than base conform to recommendations of the scrap trade and are regarded as conducive to a more healthy condition

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as concerns supply. It is believed that material held back pending expectation of the changed pricing was not of considerable volume consequently no bulge in offerings in this area is anticipated.

Birmingham — Steelmakers continue their appeal for scrap and are getting allocations to take care of most requirements. Heavy melting and most grades of cast are in short supply.

San Francisco—Combining of No. 1 and No. 2 heavy melting steel scrap probably would facilitate some local shipments and make for easier handling on the part of generators, but mills are not too sure the action will uncover appreciable additional volume. They look upon the prospect as meaning a higher price for scrap as obviously the mixed grades would be established at the higher of the two, presently $35 for number one heavy melting metal. They concede, however, it might encourage some trucking operators.

Seattle—Receipts of scrap are barely sufficient to maintain mill and foundry operations which are abnormally heavy. New regulations make it impossible to bring scrap from offshore points. While weather conditions are hampering collection in the interior, fire conditions have eased along the coast, permitting increased shipments from logging areas. Scrap buyers are going far afield in their search for new sources of supply.

Rails, Cars . . .

Track Material Prices, Page 107

New York—Locomotive orders in September set an all-time high of 459 units, of which 444 were diesels and 15, steam. Association of American Railroads reports Oct. 1 backlogs at 1827 locomotives against 1439 a year ago. New locomotives installed in the first nine months totaled 1856 against 1693 in the like 1950 period.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 109

Pittsburgh — Slowing down in foundry activity as result of cutbacks in manufacture of civilian durable goods has taken pressure off the oven coke market. Supplies are adequate for current needs. Beehive coke is plentiful. In fact, some beehive ovens that were reactivated some time ago are on curtailed operating schedules. Pending pickup in foundry activities, no general change in demand is expected. Winter weather is expected to contribute a strengthening influence in the market for both industrial and heating coke.

Cleveland—Oven coke supplies are adequate to meet all the current demands of foundries in this area. Some slight quickening in inquiry is noted in the district, however, reflecting a pickup in activity at some castings shops and also efforts of buyers to replenish stocks in anticipation of winter shipping difficulties. Little beehive coke has been coming into this district for several months.

Chicago—Foundry coke supply is abundant to meet all current demand and the easiness is expected to continue for some time. Limited stor-

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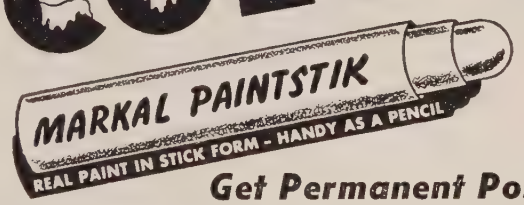

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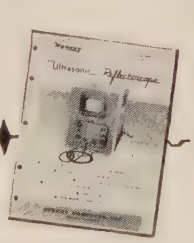

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age space results in gearing intake to melting requirements of foundries in the district.

Iron Ore . . .

Iron Ore Prices, Page 111

Cleveland—Stocks of Lake Superior ore are being accumulated steadily and are now equivalent to about six months' needs at the current rate of consumption. Mills are assured of adequate supplies to fill winter requirements. Total stocks as of Oct. 1 amounted to 45,453, 446 tons compared with 39,919,980 tons on Sept. 1 and 35,715,773 a year ago.

With 188 furnaces in blast, leaving only 8 idle, in the United States and Canada, consumption amounted to 7,472,777 tons in September and 7,-698,684 tons in August. A year ago, 181 furnaces were in blast and 13 were idle, while consumption amounted to 7,174,745 tons.

Shipments of ore for the season to Oct. 22 showed an increase of nearly 20 per cent over the movement for the like 1950 period. Shipments totaled 79,368,141 tons compared with 66,736,117 tons for the like period a year ago. Shipments for the week ended Oct. 22 amounted to 2,553,851 tons compared with 2,401,302 tons for the like week a year ago, the Lake Superior Iron Ore Association reports.

Stainless Steel . . .

Stainless Steel Prices, Page 109

Washington—Because of greatly increased demand for high nickel alloys for jet aircraft and other essential uses, National Production Authority may have to take special action to prevent the diversion of nickel to less essential uses in the first quarter. All of the available nickel is now being allocated to the mills and the outlook is that for the first quarter of 1952 the allocations will be about the same as in the fourth quarter of this year. However, because of increased military and atomic energy demands for high nickel steel, it may be necessary to reduce sharply the production of nickel-bearing alloys for civilian uses.

As for straight chromium steel, there appears to be no serious difficulty ahead in the first quarter of 1952. While the supply of chromium is not plentiful, there still appears to be enough to meet all essential requirements.

Canada To Boost Zinc Output

Discovery of new zinc deposits in the Gaspe Peninsula and a project to build two refineries in different parts of the Province of Quebec were revealed recently. East Sullivan Mines Ltd., Montreal, discovered the deposits. The two refineries will cost at least $10 million.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1350 tons, State parkway, Route 4, sections 6-J and 7-D, Union county, New Jersey, to Harris Structural Steel Co., New York.

490 tons, three state bridge projects, Sussex county, Delaware, to Belmont Iron Works, Eddystone, Pa.

200 tons, crushing and pulverizing plant, Riverton, N. J., to Bergen Iron Works, Jersey City, N. J.

STRUCTURAL STEEL PENDING

16,000 tons, South street viaduct, Department of Public Works, Manhattan, New York; bids Nov. 13.

600 tons, traffic interchange, Longfellow bridge, Charles river reservation, Boston; bids Nov. 1, Metropolitan District Commission, Boston.

500 tons, transmission towers and assemblies; bids in to Bonneville Power Administration, Portland, Oreg.

400 tons, Montana state bridge, Powell County; general contract to Montana Engineering & Construction Co., Helena, Mont.

400 tons, 648-foot Montana state bridge, Cascade county; general contract to W. P. Roscoe Co., Billings, Mont.

200 tons, government furnished, intake and diversion structure, Lucky Peak dam, Idaho; bids to U. S. Engineer, Walla Walla, Wash., Nov. 20.

175 tons, addition, Cumberland Hospital, Brooklyn, N. Y.; bids Nov. 14.

150 tons, Air Force hangar, Niagara Falls, N. Y.; bids closed Oct. 24.

110 tons, third unit Seattle viaduct; bids to Olympia, Nov. 14.

100 tons, Pennsylvania Railroad warehouse, Columbus, O.; bids Oct. 31.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, Mayo Clinic Hospital, Rochester, Minn., to Bethlehem Steel Co.

125 tons, Port Angeles, Wash., school, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1000 tons, third unit, Seattle viaduct; bids to Olympia, Wash., Nov. 14.

400 tons, (300 government-furnished) diversion structures, etc., Lucky Peak dam, Idaho; bids to U. S. engineer, Walla Walla, Wash., Nov. 20.

100 tons, Montana state bridge, Powell county; general award placed.

300 tons, Oregon state bridges, Tillamook county; three contracts awarded Tom Lillebo, Reedsport, Oreg.

Unstated, 278-foot Idaho state bridge, Fremont county; general contract to Goodwin Construction Co., Blackfoot, Idaho.

PLATES . . .

PLATES PLACED

100 tons, digester tank, Weyerhaeuser plant, Springfield, Oregon, to Chicago Bridge & Iron Co., Seattle.

Unstated, storage tanks, Army Installations, reported to Keyes Tank Co., Provo, Utah.

PLATES PENDING

Unstated, 2730 feet steel piling, third unit Seattle viaduct; bids to Olympia, Wash., Nov. 14.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Seaboard Air Line, 10 diesel-electric switching units, to the Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILROAD CARS PLACED

Great Northern, 15 caboose cars and three 95-ton flat cars, to own shops.

New York, Susquehanna & Western, 35 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Union Tank Car Co., 400 fifty-ton tank cars, to own Whiting, Ind., shops.

RAILS PLACED

New York Central, 111,500 tons of rail and tonnage of rail joint bars, distributed to United States Steel Co., Bethlehem Steel Co., Inland Steel Co., and Algoma Steel Corp. Ltd.

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Mackintosh Enters New Field

Mackintosh-Hemphill Co., Pittsburgh, entered a new field of steel manufacture and is now producing a line of forged steel rock bits in a new building adjacent to the company's Midland, Pa., plant. The company organized a Drill Bit & Tool Division which is charged with research, development and manufacture of a line of disposable rock bits. A subsidiary company, Drill Bit & Tool Co., was incorporated and will have charge of sales of the new product. The factory at Midland is equipped with forging and high-frequency-induction heat-treating equipment, plus facilities for the manufacture of forging dies and other wearing parts. This building also houses new machinery for the production of a supplemental line of hollow steel drill rods. When production gets fully under way, the Midland plant will produce about 8 million units annually.

Metal Contractors Expands

Metal Contractors Inc., Baltimore, is equipping about 5000 square feet at 2400 Sinclair Lane for general fabricating work. John Baynes is president.

Ventures in Powdered Iron

Ventures Ltd., Toronto, is constructing a plant in Cap de la Madeleine, Que., for production of powdered iron. It will have a rated capacity of 10 tons a day.

Veeder-Root Builds in South

Veeder-Root Inc., Hartford, Conn. is erecting a sales and service building on Route 29 between Greenville and Spartanburg, S. C. The company manufactures counting and computing devices.

AMF To Buy More Equipment

American Machine & Foundry Co., New York, plans to spend about $300,000 between now and Jan. 1 on additional machines for defense production at its Cheektowaga, N. Y., plant. The firm already has spent about $700,000 on machines and tools for the plant this year.

GE Plans $12 Million Plant

Canadian General Electric Co. Ltd. acquired a site in Weston, Ont., on which to erect a $12 million plant for making transformers, high voltage bushings, instruments, etc. The plant is scheduled for completion by 1953. The company will continue production of synthetic resins, foundry products and distribution transformers at its Toronto plant.

Kennedy Mfg. To Expand

Kennedy Mfg. Co., Baltimore, maker of automobile and truck trailers and metal accessory parts, awarded a contract for erection of a plant addition, comprising about 6000 square feet.

A. O. Smith Buys Supplier

A. O. Smith Corp., Milwaukee, purchased a manufacturing plant at Elkhorn, Minn. It was the headquarters of Perfection Mfg. Co. which has been manufacturing the bottom unloading mechanism for the Smith crop storage unit.

Fairless Work Progresses

Construction has started on a heating plant to serve National Tube Co.'s Fairless Works, Morrisville, Pa. Scheduled for completion in April, 1952, the plant will furnish steam for the manufacturing process as well as the buildings. H. K. Ferguson Co., Cleveland, is the builder.

Sheffield Orders Coke Ovens

Sheffield Steel Corp., Houston, awarded Engineering & Construction Division, Koppers Co. Inc., a contract to design and construct a battery of 15 new chemical-recovery coke ovens at its plant in that city. Sheffield's Houston plant now has 47 chemical-recovery coke ovens and the new battery will increase the plant's annual coal carbonizing capacity to more than 500,000 tons.

Byron Jackson Buys Firm

Byron Jackson Co., Los Angeles, acquired the stock of International Cementers Inc., previously owned by Dowell Inc., a subsidiary of Dow Chemical Co., and Baker Oil Tools Inc. Byron Jackson, producer of oil and gas well supplies, previously had a 50 per cent interest in International.

Mohr Organizes Subsidiary

John Mohr & Sons, Chicago, organized a subsidiary company, Mohr Open Hearth Division Inc., to engage in all phases of open-hearth engineering and construction. In addition to general work in this field, agreements have been made with Maerz Industrie — Ofenbau A. G., Zurich, Switzerland, by which the new company is licensed to offer the patented Maerz designs for

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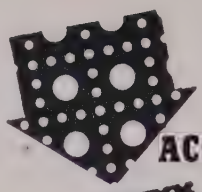

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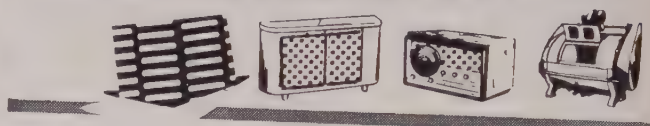

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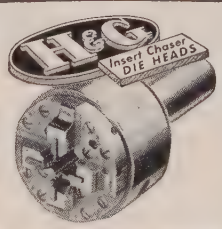

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open-hearth furnaces to the American steel industry. Officers of the new company are: Albert Mohr Jr., president; Mervin A. Fay, vice president; Louis E. Mohr, vice president; Robert E. Marsh, secretary-treasurer.

Firm Renamed Thornton Steel

Steel Engineering Co., Ft. Worth, Tex., changed its name to Thornton Steel Co. This marks the climax of an expansion program which has resulted in a 50 per cent increase in plant area. Organized in 1945 and incorporated in 1946 as engineers, fabricators and erectors of steel, the company also manufactures a line of oil field equipment. The firm is also a distributor of steel windows, joists, deck and other related products. C. Victor Thornton is president, and head of Western Steel Co., Corpus Christi, Tex. W. Lloyd Thornton is vice president and secretary of the Ft. Worth firm and secretary-treasurer of the Corpus Christi firm.

Builds Gear Plant in Ohio

Sterling Electric Motors Inc., Los Angeles, is building a plant in Van Wert, O. The plant will cost $1 million and is expected to be completed within 60 to 90 days. It will be used to manufacture precision gears.

Ferroalloys Plant Planned

A contract to build a $1 million plant to produce ferromanganese, ferrosilicon and other alloys was awarded to H. K. Ferguson Co., Cleveland, by the newly-formed Tenn-Tex Alloy & Chemical Corp., Houston. The plant will be equipped with three electric furnaces and will produce about 2000 tons of metals a month.

E. E. Wilmer & Son Move

E. E. Wilmer & Son, general machine shop work, Baltimore, moved from 4019 Falls Rd. into larger quarters at 4001 Falls Rd.

Wabash Division Plant Opens

Production in Raybestos-Manhattan's new Wabash Division has started in a 70,000 square foot plant in Crawfordsville, Ind. The plant will make sintered metal products for the military defense program. Production is currently confined to sintered metal clutch plates for tank transmissions to supplement capacity operations at the Raybestos Division, Stratford, Conn. The company plans to expand the Wabash Division over a period of years to include the manufacture of other sintered metal products for automotive automatic transmissions, agricultural and industrial equipment, as well as diversified products of asbestos and rubber.

Lauer Metal Shop Moves

Lauer Metal Shop, Baltimore, manufacturer of bronze tablets and other metal products, moved from 1108 Cathedral St. to 1516 E. Baltimore St.

Lindberg Plans Expansion

Lindberg Steel Treating Co., St. Louis, will erect an addition to its manufacturing plant.

Tubing Seal Enlarges Plant

Tubing Seal Cap Inc., San Gabriel, Calif., is adding manufacturing space for the production of seamless door knobs, miscellaneous stampings and metal closures for aircraft hydraulic lines and parts.

Builds Utah Office Building

Pacific States Cast Iron Pipe Co. is constructing a $500,000 office building at its Iron, Utah, plant. The building will be on a 48-acre plot recently acquired from Geneva Steel Co.

Plans $7 Million Plant

Davison Chemical Corp., Baltimore, will erect a $7 million catalyst plant at Lake Charles, La. The plant will produce the microspheroidal type of synthetic silica-alumina catalyst.

Machine Firm To Expand

John Ramming Machine Co., St. Louis, awarded a contract for a machine shop addition, a loading dock and roofed-over area at 4591 McRee Ave., that city.

Republic To Enlarge Stock

Republic Supply Co. of California plans to concentrate a $750,000 stock of supplies, including piping, mechanical rubber goods, wire rope, rigging supplies, tools and heavy machinery, at its newly completed northern California headquarters at San Leandro. This inventory will be 25 per cent greater than the present total carried at the Emeryville, Calif., headquarters which the San Leandro plant replaces.

Ohio Crankshaft Expanding

Construction of a plant covering about two acres is under way for Ohio Crankshaft's rapidly expanding Tocco Division. The site is on 71st street near Grant avenue, Cleveland. Occupancy is scheduled for not later than June 1, 1952. Purpose of the new plant is to consolidate and increase facilities of the company's

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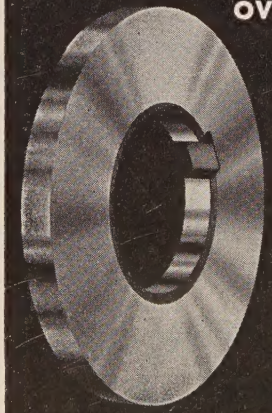
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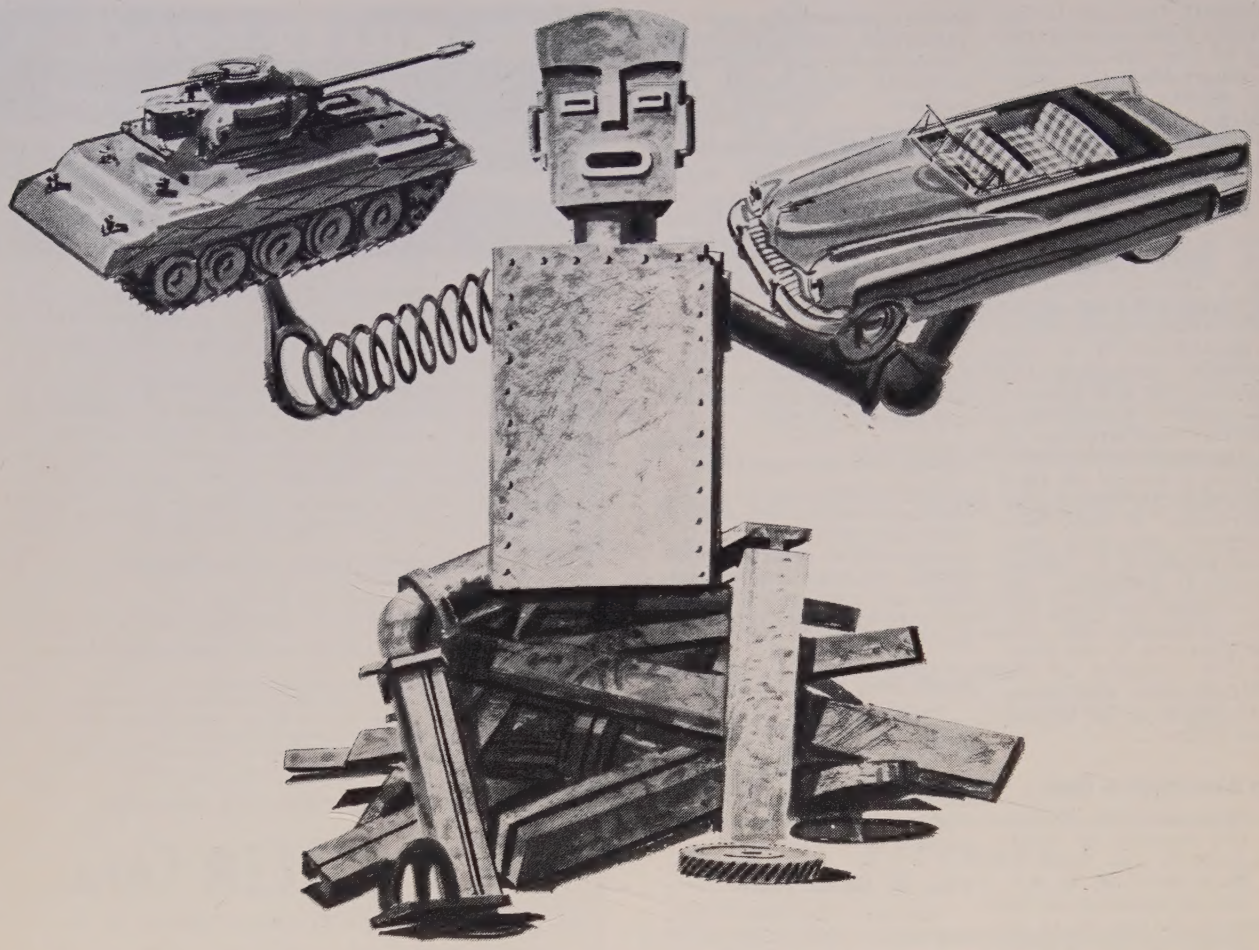

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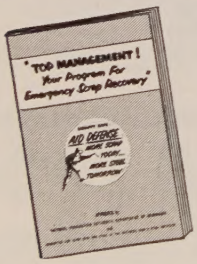

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STEEL

The Weekly Magazine of Metalworking

Tocco Division, which makes high-frequency heat-treating equipment, and to permit expansion of the company's Crankshaft and Camshaft Division into present plant areas now occupied by Tocco. The building will house large induction heating laboratories.

Electronics Firm Expands

Aircraft Armaments Inc., Baltimore — electronic engineer—opened a branch at 1422 Reisterstown Rd. This is an expansion of the company's engineering operations. The company plans erection of a plant to handle its own manufactures. The Baltimore company is controlled by the Hayes Mfg. Co., Grand Rapids, Mich., manufacturer of automobile bodies and accessories.

Loftus Gets Furnace Award

Loftus Engineering Corp., Pittsburgh, was awarded a contract for the construction of four 250-ton open hearths at the Portsmouth plant of Detroit Steel Corp., Detroit. This will approximately double the plant's capacity.

Grinding Firm Organized

Trico Engineering Co., Santa Monica, Calif., was formed to specialize in internal grinding. V. J. Soppe is the treasurer.

Twin Coach To Enlarge Plant

Twin Coach Co., Kent, O., will erect another addition to its Cheektowaga, N. Y. plant to handle expanding defense contracts. The addition will contain about 19,000 square feet of space.

Montreal Branch Opened

Peerless Engineering Sales Ltd., Toronto, representative of Reeves Pulley Co., Columbus, Ind., opened a branch office and warehouse in Montreal, Que., under the managership of Len Hackert.

Stainless Steel Products Co.

A business name has been filed in Erie county clerk's office for Stainless Steel Products Co., 746 E. Delavan Ave., Buffalo, by John J. Hochgesang.

Blake Moves to Florida

Blake Paint Corp. opened a manufacturing plant at 2494 S. Kuhl Ave., Orlando, Fla. Executive offices will be maintained at this address. Production will be continued at the company's Yonkers, N. Y., plant.

Whitcomb To Move Jan. 1

Sales, engineering and manufacturing activities of Whitcomb Locomotive Co., a wholly-owned subsidiary of Baldwin-Lima-Hamilton Corp., Eddystone, Pa., will be transferred on or about Jan. 1 from Rochelle, Ill., to the Eddystone plant. The Rochelle plant will be utilized to provide space for the expansion of the manufacturing activities of Austin-Western Co., also a Baldwin-Lima-Hamilton subsidiary, whose principal plant at Aurora, Ill., is taxed to capacity by the demand for its road-building and material handling equipment.

Binks to Construct Factory

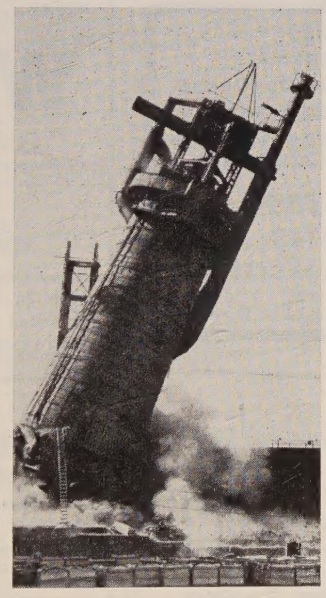
Binks Mfg. Co., Chicago, will erect a $500,000 factory building in Franklin Park, Ill.

Awards $3 Million Contract

Crown Zellerbach Corp., San Francisco, awarded Swinerton & Walbert Co. of the same city a contract for construction of a $3 million paper converting plant at San Leandro on San Francisco bay.

Curtiss Rehabilitates Shop

Curtiss-Wright Corp. is moving rapidly in rehabilitating the former Otis Elevator machine shop in Buffalo for its Metal Processing Division. The firm hopes to have pilot operations under way soon after the first of the year. The company is spending several million dollars in the rehabilitation and equipping project.



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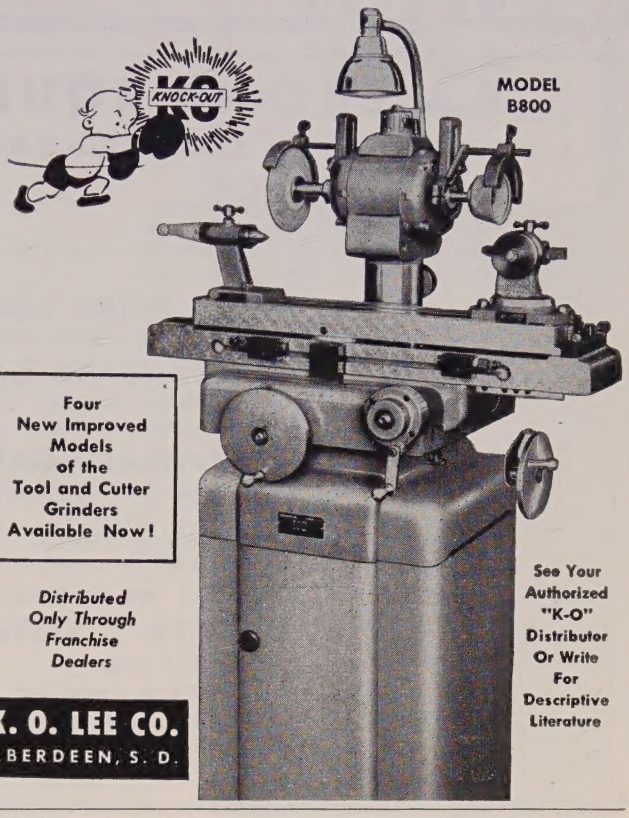

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